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A REVISION OF THE GENUS *MIMETES* SALISB. (PROTEACEAE)

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Abstract

Twelve species are recognised in this the only complete taxonomic treatment of *Mimetes* (Proteaceae) since it was studied in *Flora Capensis* in 1912. The genus is endemic to the south western and southern Cape, where it is found mainly in montane habitats on sandstone-derived soils. *Mimetes* is characterised by extreme specialisation of the inflorescences into compound structures. The flowers are almost exclusively bird pollinated.

Uittreksel

'N HERSIENING VAN DIE GENUS *MIMETES* SALISB. (PROTEACEAE)

In hierdie, die eerste volledige hersiening van *Mimetes* (Proteaceae) sedert dit in *Flora Capensis* (1912) ondersoek is, word twaalf species erken. Die genus is endemies aan die suid-westelike en suidelike Kaap waar dit hoofsaaklik in berghabitatte op gronde met 'n sandsteenoorsprong gevind word. *Mimetes* word gekenmerk deur uiterste spesialisasie van die bloeiwyses in saamgestelde strukture. Die blomme is byna uitsluitlik voëlbestuif.

Key words: *Mimetes*, Proteaceae, southern Cape, taxonomic revision, modified compound inflorescences, bird pollination.

Introduction

Mimetes is a small well-defined southern African genus of the Proteaceae, comprising twelve species which are endemic to the south western and southern Cape.

R. A. Salisbury established *Mimetes* in 1807 when he proposed a major subdivision (into additional genera) of the old Linnaean genus *Leucadendron*. At the time he assigned *Leucadendron cucullatum* L. and *Leucadendron hirtum* L. to *Mimetes* Salisb. Two years later, writing in Joseph Knight's *Proteèae* (1809), Salisbury published the first important account of *Mimetes*, increasing the number of known species to seven. The following year Robert Brown (1810) also upheld seven species in *Mimetes* but caused

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considerable confusion when he remodelled the generic concept so as to include those taxa which Salisbury had placed in another newly created genus, *Diastella* Salisb. (Rourke, 1976).

Meisner (1856), expanded the concept of *Mimetes* even further, including at sectional level, not only *Diastella* Salisb., but also *Orothamnus* Pappe ex Hook. [as section *Pseudomimetes* Endl. and section *Orothamnus* (Pappe ex Hook.) Meisn., respectively].

A more natural, and in my opinion, a better classification was eventually restored by Phillips and Hutchinson (1912) who re-instated Salisbury's original concept of *Mimetes* Salisb., upholding *Orothamnus* Pappe ex Hook., and *Diastella* Salisb., as separate genera.

Apart from the publication of three additional species by Phillips, between 1911 and 1923, no further taxonomic work on the genus was published until October 1982, when a large-format review and semi-popular account of the genus was issued (Rourke, 1982), with life-size colour illustrations of each species by Thalia Lincoln. As this costly publication may not be readily accessible except in a few major botanical libraries, a more formal taxonomic treatment of *Mimetes* is given here.

MORPHOLOGY

Inflorescence

Throughout this paper the term inflorescence has been used when referring to the highly complex flowering structure which develops towards the end of each flowering shoot and is formed out of an aggregation of numerous axillary capitula and their variously modified subtending leaves. Although Johnson and Briggs (1975) have used the term "conflorescence" for these much condensed structures in certain Australian Proteaceae, I have preferred to retain the term inflorescence for both simple and compound structures.

The formation of a *Mimetes* inflorescence commences with the development of numerous sessile capitula, each arising in the axil of one of the uppermost leaves on a shoot, a few centimetres below the apical meristem. During the flowering and fruiting phases, the apical meristem terminating each shoot (conflorescence)remains dormant. Dehiscence of the fruits is followed by abscission of the sessile axillary capitula, after which the shoot's apical meristem recommences a new annual growth flush on which axillary capitula will again develop to form the subsequent seasons compound inflorescence. In *Mimetes* this compound inflorescence (conflorescence) has developed along several lines of specialisation, all of them adaptations to ornithophily.

Modification for pollination

Mimetes are almost entirely dependent on birds to effect cross pollination. Bees, flies and other small hymenoptera may occasionally be responsible for a chance act of cross pollination, but their effective role in this process is probably minimal.

Nectar is the chief attractant. Nectar droplets are secreted into the perianth tube from four hypogynous scales (nectaries) at the base of each flower. Malachite sunbirds *(Nectarinia famosa)*, Lesser double collared sunbirds *(Nectarinia chalybea)* and Orange Breasted sunbirds *(Nectarinia violacea)* are the principal sunbird species feeding on and cross-pollinating *Mimetes*, with the latter species being most frequently in attendance. The considerably larger Cape Sugarbird *(Promerops cafer)* is also a regular visitor to certain species, accumulating pollen on its throat and forehead while foraging. Collins (1982) indicates that *Promerops cafer* is a major pollen vector in the Betty's Bay area, at least in *Mimetes hirtus*.

Through a reduction in the number of individual flowers comprising an axillary capitulum, often coupled with the modification of a brightly pigmented subtending leaf over-arching or clasping each axillary capitulum, the axillary capitula cease functioning as multi-flowered inflorescences, becoming instead functionally equivalent to single flowers, here termed pseudanthia. *Mimetes* pseudanthia have evolved to form several morphological "blossom types" (sensu Faegri and van der Pijl, 1966), each having somewhat different values as pollinator attractants.

Brush Type

The least specialised pseudanthium is of the Brush Type as seen in *Mimetes hirtus, Mimetes capitulatus, Mimetes palustris, Mimetes saxatilis, Mimetes hottentoticus* and *Mimetes stokoei*. Here styles, pollen presenters, perianths and often involucral bracts are large, prominent and brightly coloured with red, white or yellow contrasting tones. Symmetrically developed involucral bracts surround the several-flowered axillary capitula (pseudanthia). There is no change in the shape or pigmentation of the subtending leaves which remain green throughout the flowering period when the brush-like pseudanthia are at their most colourful (Fig. 1, A).

Tube Type

A more advanced stage derived from the above is the Tube Type, exemplified by *Mimetes pauciflorus*, which has axillary capitula (pseudanthia) reduced to a mere three flowers surrounded by short involucral bracts. Tightly adpressed, bright yellow floral bracts enfold the styles forming a straight but narrow tube from which only the perianth limbs and pollen presenters protrude (Fig. 1, C). In this case each pseudanthium mimics the

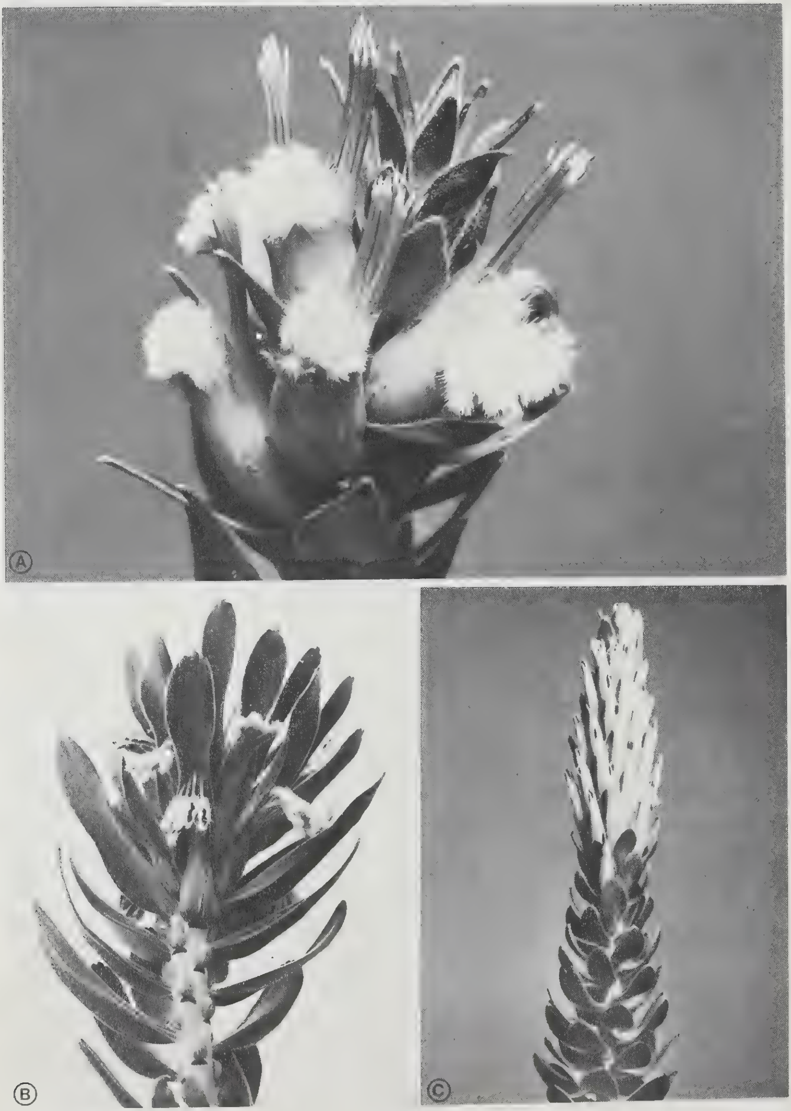

FIG. 1.

Compound inflorescences in *Mimetes* showing various adaptations to ornithophily; (A) pseudanthia of the "Brush Type" on *M. capitulatus*; (B) pseudanthia of the "Gullet Type" in *M. cucullatus*. For the sake of clarity, some of the lower leaves have been removed in B, including the leaf subtending the lowermost pseudanthium, viewed here anteriorly; (C) three-flowered pseudanthia of the "Tube Type" in *M. pauciflorus*.

corolla of a long-tubed flower, such as *Erica*, for example. It would appear that the reduction to only three flowers per pseudanthium would scarcely favour large-scale seed production in *Mimetes pauciflorus*, despite the fact that this drastic morphological modification has evidently resulted in a functionally effective tube flower, conducive to attracting pollinators. However, negative as the reduction in flower number per pseudanthium may seem, it is more than compensated for by an enormous increase in the number of axillary capitula in each inflorescence; usually to over three times the number characteristic of other species.

Gullet Type

The third, and by far the most advanced development, is the Gullet Type in which the pseudanthia mimic and are functionally equivalent to bilaterally symmetrical flowers found in families like Lamiaceae, Scrophulariaceae or Acanthaceae (Vogel, 1954; Faegri and van der Pijl, 1966).

Both *Mimetes cucullatus* and the related *Mimetes fimbriifolius* are unique among *Mimetes*, in that the involucral bracts surrounding their axillary capitula (pseudanthia) are asymmetrical, forming bilabiate involucres. The anterior bracts are elongated and enlarged, while the posterior bracts are markedly shorter (usually one-third of the length of the anterior bracts). Moreover, each axillary capitulum is partially enfolded by the hooded, forwardly deflected subtending leaf of the capitulum above it; the whole forming a bilaterally symmetrical gullet-shaped pseudanthium. During flowering the elongating styles spring free of the perianths pressing onto the hooded subtending leaf above, by now brilliantly coloured with red pigments, but later, after anthesis, reverting to a green foliage leaf (Figs 1, B and 2).

Architecturally and functionally, each pseudanthium and its superposed subtending leaf parallels a single bilabiate zygomorphic flower such as is found in families (e.g. Lamiaceae) where this type of floral morphology typically occurs. Indeed, the parallelism in *Mimetes* is such that Porsch (1931), an early commentator on ornithophily in *Mimetes* (who saw no living flowering specimens) actually considered the axillary capitula to be single flowers. Vogel (1954) regarded the specialised "Gullet Type" of pollination mechanism in certain *Mimetes* as the most advanced level of ornithophily in the southern African Proteaceae, a view-point with which the present author concurs.

SYSTEMATIC POSITION AND RELATIONSHIPS

Mimetes, together with eleven other South African proteaceous genera, is presently placed within the Subtribe Proteinae of the family Proteaceae (Johnson and Briggs, 1975). A chromosome number of twelve is common to

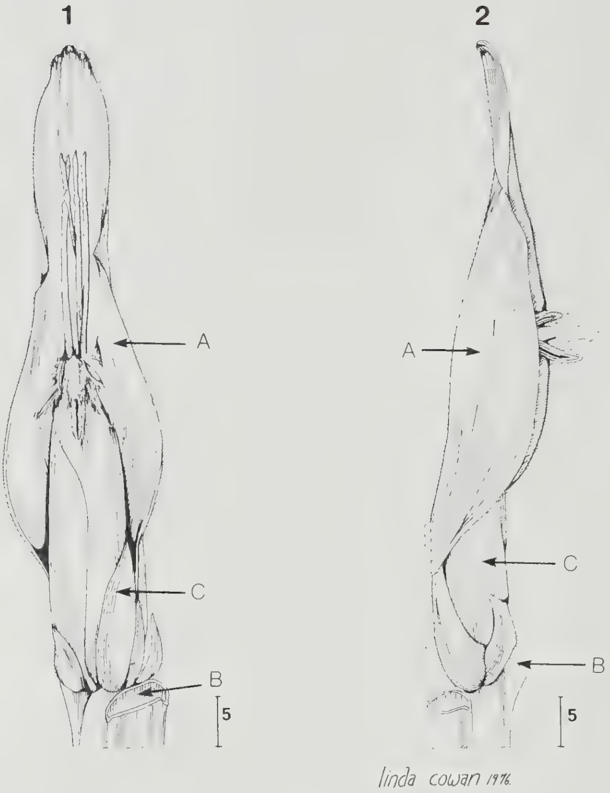

Fig. 2.
Single, detached pseudanthium of *Mimetes fimbriifolius*, consisting of a four-flowered axillary capitulum and conduplicate anteriorly deflected superposed subtending leaf (A) as seen anteriorly (1) and laterally (2). The scar of the leaf subtending the capitulum is in the anterior right position (B). Only the enlarged anterior involucral bracts (C), are visible.

all component genera of the subtribe. However, even within this relatively homogeneous subtribal grouping, several obvious subsidiary clusterings may be discerned. *Leucospermum, Diastella, Mimetes* and *Orothamnus* form one such cluster, united by the presence of several common morphological features. The most fundamental unifying factor linking these four genera is the form and structure of their fruits. These are ovoid to cylindric, minutely puberulous achenes ridged on the adaxial surface. Grafting compatability between all four genera is another indication of their affinities. (A discussion on the relationships between these genera will be given in a forthcoming paper on *Orothamnus*.)

There is a particularly close alliance between *Mimetes* and *Leucospermum*, as both have axillary capitula clustered towards the apices of their flowering shoots, while many of the species in both genera have toothed leaves or, if not, then entire leaves with a single apical callosity. It is but a short step from a Leucospermum-like ancestral form with multi-flowered pedunculate axillary capitula, to a progenitor of *Mimetes* with few-flowered sessile axillary capitula (Fig. 3).

In speculating on the possible origin and affiinities of *Mimetes*, it is not unreasonable to suggest that *Mimetes* has evolved from a Leucospermum-like ancestor and that the genus has subsequently undergone reduction and specialisation, particularly in respect of its complex compound inflorescences, where most of the adaptations are related to pollination mechanisms, especially ornithophily.

DISTRIBUTION

Mimetes exhibits a distribution pattern typical of many endemic genera within the Cape floristic kingdom; namely, having the greatest species concentration in the mountainous, high rainfall area of the extreme south west, centered around the Kogelberg Forest Reserve (Levyns, 1964; Goldblatt, 1978).

The genus occurs over most of the south western and southern Cape from the Cold Bokkeveld, near Porterville in the north, southwards to the Cape Peninsula, then eastwards along the Hottentots Holland, Langeberg, Outeniqua and Tsitsikamma mountains to an area a few kilometres beyond Formosa Peak on the coastal ranges; with isolated populations on Rooiberg, the Klein Swartberg and Kouga mountains on the inland ranges (Fig. 4). Although half the known species have been recorded from within the approximately 24,000 hectare Kogelberg Reserve, this area cannot be assumed to be the centre of origin for the genus; yet it is certainly a major centre of speciation. Great habitat diversity, coupled with a multitude of microclimates, have provided opportunities for speciation to take place there.

Moist mesic conditions appear to be an ecological prerequisite of the genus. In this regard it is probable that climatic fluctuations since the early Pleistocene have had a significant influence on the distribution and evolution of *Mimetes*. During cooler, moister periods, distribution ranges would probably have expanded, while in warmer drier times they would have contracted, isolating populations from each other.

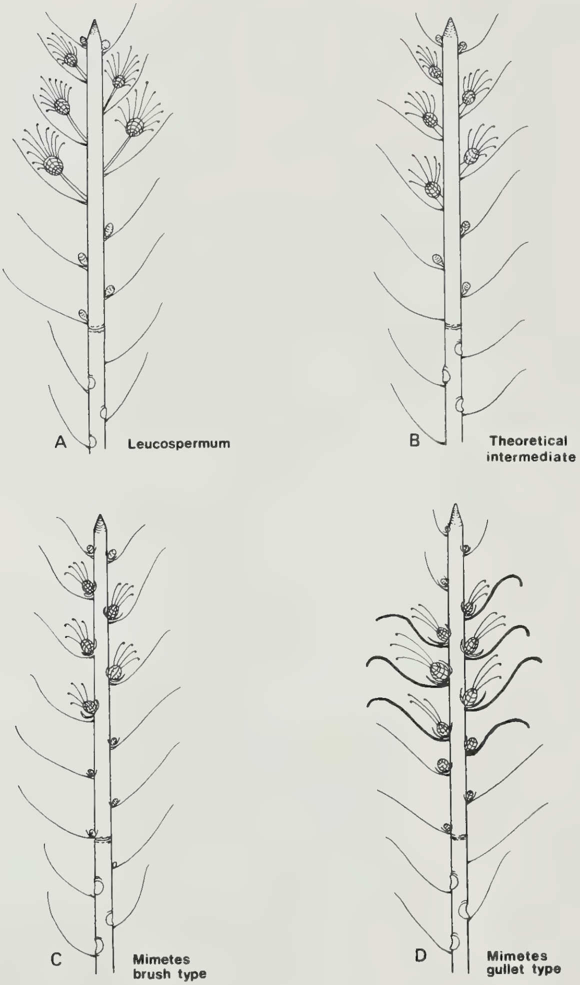

FIG. 3.
Schematic representation of flowering shoots in *Leucospermum* (A) and *Mimetes* (C and D), with a theoretical intermediate between the two genera (B). Abscission scars of the previous year's capitula are indicated on the penultimate growth flush. The axillary capitula in *Leucospermum* (A) are pedunculate. In *Mimetes* (C and D), the axillary capitula are sessile and together with the apical portion of the current years growth flush, form a compound inflorescence. In (C) the compound inflorescence is formed of "Brush Type" pseudanthia, while (D) is formed of "Gullet Type" pseudanthia.

Strong indications of such events can be seen from the distribution of *M. cucullatus* (Fig. 7), the most widespread and polymorphic species in the genus. Abundant on the coastal Langeberg, it is also found in a few relatively mesic but isolated refugia on the arid interior ranges; these being on Rooiberg, an inselberg in the middle of the Little Karoo; on the Klein Swartberg, above Ladismith and in the Kouga Mountains, Baviaanskloof.

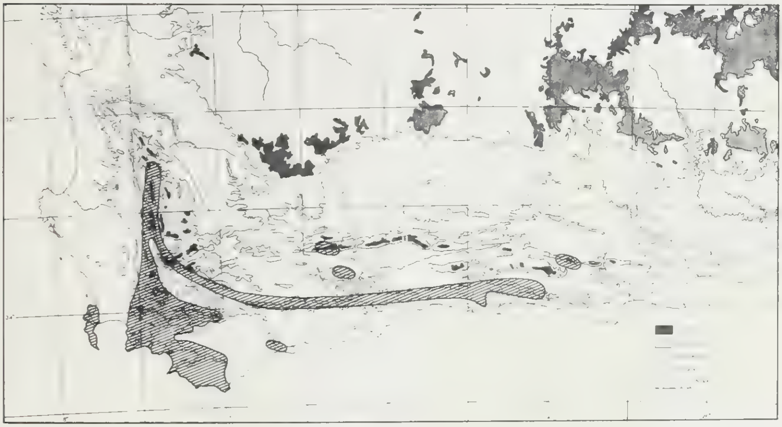

FIG. 4.
Distribution range of the genus *Mimetes*.

Such a disjunct pattern suggests that this species had a wider distribution at some stage in the past and that increasing aridification has reduced its range on the drier interior mountain chains to the few widely isolated refugia, where it presently survives.

Mimetes cucullatus is not only the most widespread, polymorphic species in the genus, it is also the most successful biologically, and displays the most advanced modifications in respect of floral morphology and inflorescence structure. The character of fire resistance resulting from the development of a woody, persistent lignotuber, as well as a high degree of ecological adaptability, have probably also contributed to the species' successful spread.

Mimetes Salisb. in Parad. Lond. sub. t.: 67 (April 1807); Knight, Cult. Prot.: 64 (1809); R. Br. in Trans. Linn. Soc. Lond. **10**: 108 (1810)—pro. parte; Meisn. in DC., Prodr. **14**: 262 (1856)—pro parte excluding Sect. *Orothamnus* Meisn. & Sect. *Pseudomimetes* Endl.; Phill. & Hutch. in Fl.

Cap. **5**: 643 (1912); Adamson & Salter, Fl. Cape Penins.: 322 (1950); Dyer, Gen. of S.A. Fl. Pl. **1**: 43 (1975); P. van der Merwe in Landbou Weekblad 8 July 1977: 82, 83, 85 (1977), and in Landbou Weekblad 15 July 1977: 82, 83 (1977); Paterson Jones in Veld & Flora **64** (3): 78 (1978); Rourke & Lincoln, *Mimetes*, Tiyan Publishers, 1–177, Oct. 1982.

Mimetes Salisb. Sect. *Eumimetes* Endl., Gen. Pl. suppl. **4** (2): 78 (1848).

Hypophyllocarpodendron Boerehaave, Index Alter Plant. **2**: 205, 206 (1720).

Lectotype: M. hirtus (L) Salisb. ex Knight

Shrubs or small trees. *Leaves* alternate; sessile, ascending, subimbricate to imbricate, oblong, oblong-elliptic, oval or rhombic, entire with a thickened apical callus or dentate with several apical teeth. *Inflorescence* cylindric, an aggregation of sessile axillary capitula; capitula 3 to 22-flowered, surrounded by an involucre of small, oval oblong or lanceolate bracts. *Involucral bracts* small and woody or enlarged, brightly coloured, fleshy to papyraceous. Flowers bisexual, regular. *Perianth* cylindric in bud; tube very short, cylindric, quadrangular or bulbous, usually glabrescent; claws filiform, pubescent; limbs linear, acute to acuminate, glabrescent or pubescent. *Anthers* linear, acute, sessile, arising from base of perianth limb. *Ovary* slender pubescent, scarcely differentiated from style, with a single terminally attached ovule. *Style* terete, curved while elongating but straight after anthesis. *Pollen presenter* linear-acute to acuminate, or with a cylindric, ovoid-capitate or conic-capitate apex, usually geniculate or annulate at junction with style. *Hypogynous scales* 4, obtuse or linear-filiform. *Fruit* an ovoid or cylindric achene, broadly or narrowly introrse at base, glabrous to minutely puberulous. *Chromosome number* $n=12$ (de Vos, 1943).

DISTRIBUTION

A genus of twelve species endemic to the south western and southern Cape Province; confined mainly to the coastal mountains, ranging from Porterville and the central Cold Bokkeveld in the north west to the Tsitsikamma mountains in the vicinity of Storms River in the south east, and with inland outliers in the Kouga mountains (Baviaanskloof Forest Reserve), being the most easterly record.

DIAGNOSTIC CHARACTERS

Mimetes is distinguished by its numerous *few-flowered* (3–22-flowered) *sessile* axillary capitula.

DERIVATION OF NAME

Mimetes is derived from a Greek substantive, meaning a mimic or imitator; "this genus resembling several others in its foliage" according to

Salisbury (1809). The word mimic (i.e. an actor or dancer) has a masculine gender, since in ancient Greece both male and female theatrical parts were taken by men. Salisbury (1809) clearly construed it as masculine, using masculine endings for the specific names of the various *Mimetes* he described. Robert Brown (1810), as well as Phillips and Hutchinson (1912), preferred to interpret *Mimetes* as feminine. I intend to follow the original (and, I believe, correct) usage by adopting masculine terminations for the specific names of *Mimetes*.

KEY TO THE SPECIES

1. Leaves densely silvery-sericeous

2. Pollen presenter capitate

3. Involucral bracts lanceolate-acuminate .... (7) **hottentoticus**

3′ Involucral bracts oval to rounded .... (8) **stokoei**

2′ Pollen presenter linear-subulate

4. Involucral bracts thin-textured, papyraceous and brown when dry, outer surface glabrous or nearly glabrous (except for ciliate margins) .... (4) **splendidus**

4′ Involucral bracts thick and cartilaginous, woody when dry, outer surface cinereously sericeous.

5. Leaves elliptic to broadly elliptic, growth habit shrubby at maturity with main branches occasionally dichotomous; range extends north and north east of Sir Lowry's Pass to Hottentots Holland mountains, Grabouw, Nuweberg, French Hoek, Villiersdorp and to Riviersonderend .... (5) **argenteus**

5′ Leaves lanceolate, growth habit arborescent at maturity with stout main trunk and dense rounded crown of short repeatedly dichotomous branches, bark thick; range extends south of Sir Lowry's Pass, Steenbras to Kogelberg State Forest ... (6) **arboreus**

1′ Leaves variously pubescent or glabrous but not silvery-sericeous.

6. Pollen presenter capitate or swollen at apex.

7. Leaves acute, often tapering abruptly, entire .... (12) **capitulatus**

7′ Leaves broadly elliptic to oblong, apex obtuse or rounded, often tridentate, rarely entire .... (3) **saxatilis**

6′ Pollen presenter linear-subulate at apex but sometimes annulately swollen in middle.

8. Capitula 3 (very rarely 4)-flowered ....(10) **pauciflorus**

8′ Capitula 5 or more-flowered.

9. Leaves entire.

10. Styles 30–35 mm long .... (11) **palustris**

10′ Styles 50–55 mm long .... (9) **hirtus**

9′ Leaves dentate at apex

11. Leaf margins densely ciliately fringed, leaves 40–70 mm long. Growth habit arborescent. Confined to Cape Peninsula .... (2) **fimbriifolius**

11′ Leaf margins either glabrous or pubescent but not ciliately fringed. Leaves 22–55 mm long. A multiple-stemmed shrub with subterranean lignotuber .... (1) **cucullatus**

(1) **Mimetes cucullatus** (L.) R. Br. in Trans. Linn. Soc. Lond. **10**: 107 (1810); Meisn. in DC., Prodr. 14: 263 (1856); Rourke in Mimetes: 19–29 (1982).

Leucadendron cucullatum L., Sp. Pl. ed 1: 93 (1753); Berg., Descript. Plant. Cap.: 14 (1767). Type: Boerhaave, Index Alter Plant. (2): 206, t. 206 (1720)—lectotype.

Protea cucullata (L.) L., Mant. Alt.: 189 (1771); Thunb. Diss. Prot.: 23 & 49 (1781).

Mimetes lyrigera Salisb. ex Knight in Knight, Cult. Prot.: 65 (1809); Phill. & Hutch. in Fl. Cap. **5**: 645 (1912);—nom. superfl. Type: As for *Leucadendron cucullatum L.*

Mimetes cucullatus (L.) R. Br. var. *brevifolia* Meisn. in DC., Prodr.: 263 (1856). Type: No type cited or designated—description only.

Mimetes cucullatus (L.) R. Br. var. *ludwigii* Meisn. in DC., Prodr. **14**: 263 (1856). Type: *Ludwig 36* in herb. Reg. Stuttgart—not traced, apparently lost or destroyed, but clearly identifiable from description.

Mimetes ludwigii Steudel ex Meisn., in DC., Prodr. **14**: 263 (1856)—nom. nud.

Mimetes mixta Gandoger in Bull. Soc. Bot. Fr. **48**: 93 (1901). Type: Prope Groot Houhoek ad Potrivier necnon ad Klynrivier, July, *Zeyher 1478* in herb. Gandoger (LY, holo.!; photo, NBG).

Mimetes cucullatus R. Br. forma *dregei* Gandoger in Bull. Soc. Bot. Fr. **48**: 93 (1901). Type: No type cited or designated—description only.

Mimetes dregei Gandoger & Schinz in Bull. Soc. Bot. Fr. **60**: 51 (1913). Type: "Cap, (*Drège* sub nom. *M. cucullatae* R. Br.)", in herb. Gandoger (LY, holo.!; photo, NBG).

Mimetes cucullatus R. Br. forma *laxa* Gandoger in Bull. Soc. Bot. Fr. **48**: 93 (1901). Type: "Appelsbosch et Woormansbosch, *Zeyher 3693*", in herb. Gandoger (LY, holo.!).

Mimetes laxifolia Gandoger & Schinz in Bull. Soc. Bot. Fr. **60**: 51 (1913). Type: "Appelsbosch et Woormansbosch, *Zeyher 3693*", in herb. Gandoger (LY, holo.!; photo, NBG).

Mimetes schinziana Gandoger in Bull. Soc. Bot. Fr. **60**: 51 (1913). Type: "cap ad Rivier Zonder Ende, *Schlechter 5646*" (Z, holo!).

PRE-LINNAEAN CITATIONS

Leucadendros Africana, s. Scolymocephalus, angustiori folio, apicibus tridentatis. Pluk., *Opera 2 (Almagest.)*: 212 tab. 304 fig. 6 (1696).

Hypophyllocarpodendron; foliis inferioribus apice trifido, rubro, superioribus penitus rubris, glabris. Boerhaave, *Index Alter Plant.* (2): 206, t. 206 (1720).

Scolymocephalus africana foliis angustis, brevioribus, tribus in summitate denticulis, capitulis foliolis interceptis Herman, *Cat. Plant Afr.*: 20 (1737).

Protea foliis lanceolatis obtusis foliis involventibus apice tridentato-callosis. Royen, *Prod. Lugd. Bat.*: 184 (1740).

Leucadendron folii cuneiformibus apice tridentato—callosis summis ultra florem protensis. Wachendorff, *Hort. Ultraj*: 203 (1747).

Diese blom groeytis vogtige Plaatse dried voet hoog bloeyd in Octobr. No date or author, folio 125, *Index Plant. et Animal* in Africana Mus., Jhb.

An erect shrub 1–2 m in height, multiple-stemmed at base, the numerous branches arising from a stout subterranean lignotuber. *Branches* upright, 3–8 mm in diam., usually simple, only occasionally dichotomous or branched, densely cinereously villous, tending to glabrescent later. *Leaves* very narrowly to broadly oblong-elliptic 25–55 mm long, 5–20 mm wide; leaves subtending axillary capitula narrowly obpandurate becoming anteriorly conduplicate, cucullate, clasping the capitulum immediately below; truncate at base, apex tridentate rarely entire, puberulous at first, soon glabrous. *Inflorescence* cylindric, 60–100 mm long, 40–70 mm wide, topped by a suberect coma of reduced narrowly oblong reddish flushed leaves, *Capitula* 4–7-flowered, subtended by a reddish or yellow-flushed, cucullate, anteriorly conduplicate leaf either entire or tridentate at apex. *Outer involucral bracts* glabrous, unequally developed, forming a clasping bilabiate involucre; anterior bracts large, elliptic-acuminate 15–30 mm long, 3–12 mm wide; posterior bracts lanceolate-acuminate 8–10 mm long, 1,5–3 mm wide; inner involucral bracts narrowly lanceolate-acuminate, margins sericeously ciliate. *Floral bracts* linear, acuminate to subulate, 6–10 mm long. *Perianth* 35–40 mm long, curved adaxially in bud; tube inflated, 1 mm long, glabrous, claws 10 mm long; filiform puberulous to sparsely sericeous; limbs linear-acute scarcely differentiated from claws, densely sericeous. *Style* 45–50 mm long. *Pollen presenter* linear-subulate 5–7 mm long, annulately thickened at junction with style, apex sharply acuminate, stigmatic groove terminal. *Ovary* oval,1 mm long, densely sericeous. *Hypogynous scales* subulate, fleshy, 2 mm long.

Distribution and Habitat

The most widely distributed and variable species in the genus, *M. cucullatus* is found on Table Mountain Sandstone formations in most mountain ranges in the south western and southern Cape, from sea level to 1 200 m,

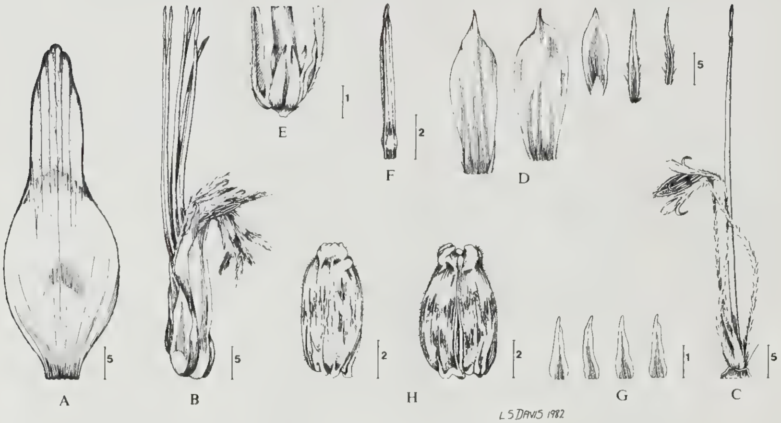

Fig. 5.
Mimetes cucullatus (A) leaf; (B) axillary capitulum, lateral view; (C), single flower; (D) involucral bracts; (E) base of perianth; (F) pollen presenter; (G) hypogynous scales; (H) fruits. Scale lines in millimetres.

though mainly below 500 m. It is particularly common in moist coastal areas between Cape Hangklip and Bredasdorp, often forming large local stands. However, it tends to be scattered or occasional in drier inland habitats.

Isolated outliers occur in moist refugia within otherwise arid montane habitats like the Rooiberg in the Little Karoo, the Klein Swartberg, above Ladismith, and at a single locality in the Kouga Mountains (Baviaanskloof Forest Reserve); the latter site being the most isolated and also the most easterly for the species. Such a distribution pattern suggests that *M. cucullatus* may have been more widely distributed in the past but that increasing aridification at the northern and eastern perimeters of its range has greatly reduced its occurrence there.

This species is characterised by the presence of a stout subterranean lignotuber and is consequently exceptionally fire resistant. Repeated burning maintains *M. cucullatus* as a compact shrub of rounded appearance, with numerous upright unbranched stems arising from the rootstock.

Older specimens, if left unburnt for many years, eventually attain two metres with straggling, occasionally branched stems, but this condition is seldom encountered due to the frequency of fire.

Profuse flowering occurs mainly on vigorous young growth which regenerates from the lignotuber in the first few years after a fire. Thereafter, flowering diminishes progressively every year as the regrowth matures and the aerial stems become senescent. Time of flowering is also partly dependent on the occurrence of fire, as well as seasonality. Flowering may thus take place locally at any time of the year, though mainly between August and March.

VARIATION

Mimetes cucullatus is highly polymorphic. Dwarf, less robust forms appear randomly within the species' distribution range, displaying generally smaller inflorescences and shorter narrower leaves (Fig. 6). Although genetically stable, their sporadic occurrence, as well as the presence of a whole range of intermediates, precludes the meaningful recognition of infraspecific taxa based on leaf dimensions and inflorescence size. Colour variants having yellowish-green subtending leaves in the inflorescence instead of reddish-orange coloured subtending leaves, are also encountered. However, both yellow and red variants grow sympatrically and are always linked by a series of pale yellowish-orange intermediates, again precluding the recognition of clearcut infraspecific taxa based on inflorescence colour.

DIAGNOSTIC CHARACTERS

In *M. cucullatus* the involucre surrounding each axillary capitulum is asymmetrical due to an enlargement and elongation of the anterior involucral bracts to about twice or three times the length of the posterior bracts. The resultant structure is a "bilabiate" involucre characteristic of *M. cucullatus* and the related *M. fimbriifolius*. Apart from very obvious differences in growth habit, the two species are readily distinguished by the fully mature leaves. In *M. cucullatus* they are shorter (22–55 mm long) and glabrous, while the leaves of *M. fimbriifolius* are longer (40–70 mm long) and thickly fringed with dense white cilia.

SPECIMENS EXAMINED

CAPE PROVINCE—3219 (Wuppertal): Olifants River Valley, Grootfontein, south east of Grassruggens (-CC), Oct., *Oliver 4086* (STE); Sandy plateau on Twenty Four Rivers mts., above Porterville, Oct., *Esterhuysen 16149* (BOL).
—3318 (Cape Town): On Table Mountain (-CD), 24.1.1811, *Burchell* 661 (K); Kirstenbosch, north boundary, Aug., *Esterhuysen 17382* (BOL); Twelve Apostles, Feb., *Pillans s.n.* (BOL); Jonkershoek (-DD), Aug., *Bos 292* (STE); Jonkershoek beside Langrivier catchment area, Feb., *Walters 6* (STE).
—3319 (Worcester): Between Rosendalfontein and Visgat (-AA), Nov., *Pillans 9644* (BOL); North east boundary of Visgat, upper Olifants River Valley, Dec., *Rourke 1502* (NBG); Above Tulbagh waterfall (-AC), Oct., *Phillips 525* (SAM, K); Witzen-

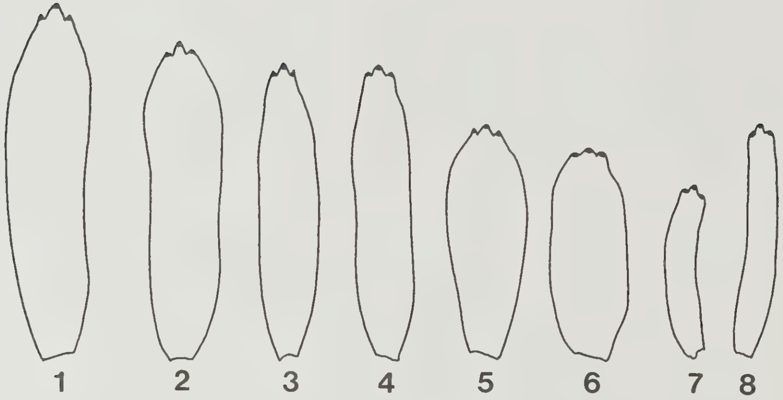

FIG. 6.
Variation in the leaves of *M. cucullatus*. The leaf outlines shown here are representative samples taken from the following herbarium collections, all in NBG: (1) *Middlemost 1988*; (2) *Rourke 973*; (3) *Rourke 1273*; (4) *Barker 9131*; (5) *Compton 9143*; (6) *Rycroft 2863*; (7) *Rourke 1502*; (8) *Wurts 279*.

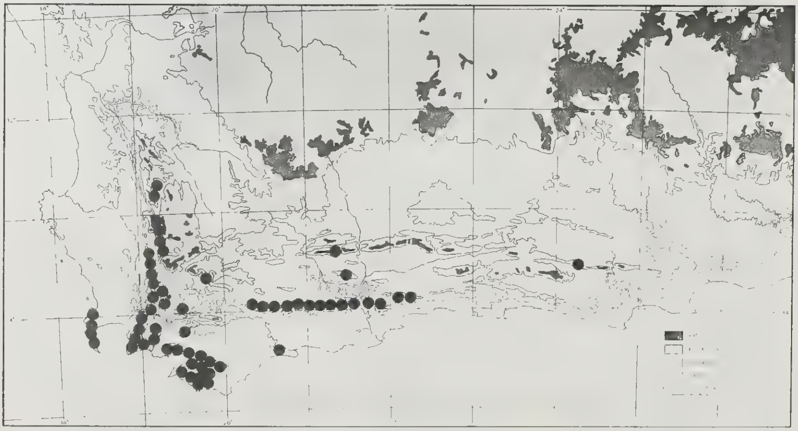

FIG. 7.
Distribution of *Mimetes cucullatus*.

berg, near Tulbagh, 17/4/1811, *Burchell 8692* (K); Prope Ceres (-AD), Dec., *Bolus s.n.* (BOL); Mitchells Pass near toll house, April, *Marloth 1695* (NBG); Hugo's Berg, NW of Prince Alfred's Hamlet, June, *Oliver 4868* (STE); Bain's Kloof, Wellington (-CA), Oct., *Lewis-Grant 2618* (PRE); Du Toitskloof mts. (-CC), 30/11/1827, *Drège s.n.* (P); French Hoek, Oct., *Barker 4178* (NBG, BOL); Waterkloof beneath Sneeuwkop on Rawsonville side of mountain (-CD), April, *Le Roux s.n.* (NBG *19437*); Upper north slopes of Jonaskop, Nov., *Rourke 973* (NBG); Lower slopes of Naudesberg, Koo (-DA), Nov., *Barker 9131* (NBG).

—3320 (Montagu): Langeberg, near Montagu (-CC), Oct., *Esterhuysen 23865* (BOL); Kogmans Kloof, Oct., *Barnard 688* (SAM); Lower south slopes of Leeuwrivier berge, Swellendam (-CD), Sept., *Esterhuysen 27869* (BOL); Base of the Crown Mountain, Swellendam, Aug., *Wurts 280* (NBG); Tradouw Pass (-DC), Oct., *Levyns 655* (STE); Barrydale mts., Oct., *Barnard s.n.* (SAM *29012*); Strawberry Hill, Heidelberg (-DD), Sept., *D. J. van der Merwe s.n.* (STE *10201*); Grootvadersbos, below Lemonshoek, Nov., *Rourke 1273* (NBG).

—3321 (Ladismith): Klein Swartberg, on southern aspect of Toorkop (-AC), Nov., *Vlok 759* (NBG); South side of Elandsberg, Klein Swartberg, Ladismith (-AD), July, *Wurts 1398* (NBG); Rooiberg, along ridge road to Bailey Peak (-CB), April, *H. C. Taylor 9659* (STE); Rooiberg, Ararat Ridge, Dec., *H. C. Taylor 9772* (STE); Garcias Pass, Riversdale (-CC), *Bolus 11362* (PRE); Mountains above Corente River, Riversdale, June, *Muir 388* (PRE); Grootwaterval, north slopes of Langeberg between Muiskraal and Cloetes Pass (-CD), May, *Rourke 1339* (NBG); North slopes of Cloetesberg between Grootplaas and Woeska (-DC), Dec., *Rourke 1511* (NBG); Carbonaatjieskraal at entrance to Attaquaskloof area (-DD), Nov., *Oliver 4147* (STE, NBG).

—3322 (Oudtshoorn): Ruytersbosch, Mossel Bay, south aspect (-CC), Sept., *Van Niekerk 118* (BOL); Jonkersberg, Oct., *Phillips 1082* (BOL); Top of Robinson Pass, *Acocks 20585* (PRE); Robinson Pass, Dec., *Maguire 794* (NBG); Geelhoutboomberg, George, on south slopes (-CD), Aug., *von dem Bussche 17* (NBG).

—3324 (Willowmore): Kouga mountains, next to forestry track on watershed between Diepriver and Drinkwaterkloof, 9/12/1982, *J. H. J. Vlok 521* (SAAS, NBG).

—3418 (Simonstown): In humidis in monte Muizenberg (-AB), March, *Bolus 4198* (BOL); Near Smitswinkel, Cape Peninsula (-AD), April, *Compton 8703* (NBG); Vergelegen (-BA), Oct., *Barker 9092* (NBG); Sir Lowry's Pass, Sept., *Rodin 1356* (PRE, K); Betty's Bay (-BD), Sept., *Parker 4517* (BOL, K); Pringle Bay, Jan., *Rourke 1022* (NBG); Palmiet River Mouth, Dec., *Pillans 8518* (BOL); Sunny Seas, Betty's Bay, Nov., *Rourke 1501* (NBG, PRE, MO).

—3419 (Caledon): In clivis oriental. mont. Hottentotsholland prope Grabouw (-AA), *Bolus 4198* (BOL); Caledon side of Houw Hoek Pass, *Story 3084* (PRE); Above Caledon Baths Hotel (-AB), Sept., *Hutchinson 506* (K, PRE); Hawston (-AC), Sept., *Marloth 9201* (STE); Hermanus, Dec., *van der Merwe 2031* (STE); Road to Elim, 15 miles from Stanford (-AD), Fernkloof Nature Reserve, Hermanus south slopes of Platberg, Sept., *Rourke 1743* (NBG, PRE, MO), Oct., *Gillet 4492* (PRE); Genadendal, in Montibus (-BA), *Schlechter 9844* (PRE, L, PENN, PH), Riviersonderend (-BB), Oct., *Schlechter 5646* (PRE), Danger Point mountain (-CB), Jan., *Leighton 1597* (BOL); Ten miles from Gansbaai on Elim road (-DA), Sept., *Richmond 25* (NBG); Elim hills, Bredasdorp (-DB), Aug., *Compton 9143* (NBG); Geelrug, east-facing slopes and flats, March, *Oliver 3350* (STE); Springfontein, south of homestead (-DD), Dec., *Rourke 1175* (NBG).

—3420 (Bredasdorp): One mile from Bredasdorp on Agulhas road (-CA), Sept., *Richmond 15* (NBG); Mountain above Bredasdorp village, Nov., *Barker 10869* (NBG); Middle south slopes of Potteberg (-BC -BD), Oct., *Pillans 9339* (BOL).

(2) **Mimetes fimbriifolius** Salisb. ex Knight in Knight, Cult. Prot.: 65 (1809); Palmer & Pitman, Trees of S.A. **1**: 552, 533 (1972); Rourke in Mimetes: 33–39 (1982). Type: Mountains near Simons Bay, *J. Niven* (not traced); therefore Boerhaave, Index Alter. Plant. **2**: 205, t. 205 (1720) also cited in original descript., taken as lectotype.

Mimetes hartogii R. Br. in Trans. Linn. Soc. Lond. **10**: 108 (1810); Meisn. in DC., Prodr. **14**: 263 (1856); Adamson & Salter, Fl. of Cape Penins.: 327 (1950); M. Kidd, Wild Flowers of the Cape Peninsula: t. 34 No. 4 (1950). Type: In collibus prope Simons Bay, Oct. 1801, *R. Brown s.n.* (BM, holo.!).

Mimetes cucullatus (L.) R. Br. var. *hartogii* (R. Br.) Phill. in Fl. Cap. **5**: 646 (1912).

Protea cucullata β. Lam. Tab. Encycl. Meth. Bot. **1**: 239 (1792). Type: Based on a specimen so annotated in herb Lamarck (P—LA!).

PRE-LINNAEAN CITATIONS

Hypophyllocarpodendron; foliis lanuginosis; in apice trifido, rubro, quasi florescens. Boerhaave, *Index Alter Plant* **2**: 205, t. 205 (1720).

arb: afr: montana fl. rub: Kreupelboom groeyd op het plat der bergen 8 ag voet hoog bloeyd in October: no date or author, folio 32, *Index Plant. et Animal* in Africana Mus., Jhb.

A small tree 2,5–5 m tall with a dense rounded, spreading crown up to 5 m in diam., trunk stout, 250–600 mm in diam., covered with dark grey irregularly fissured corky bark up to 25 mm thick. *Branches* stout, stocky 10–12 mm in diam., repeatedly dichotomous, densely velutinous, eventually glabrous. *Leaves* densely ascending imbricate, oblong to elliptic-oblong, 40–70 mm long, 12–22 mm wide, truncate and sessile at base, apices obtuse, tridentate; densely velutinous initially, eventually glabrescent, but margins densely fimbriate with white cilia; leaves subtending axillary capitula obpandurate, becoming cucullate, anteriorly conduplicate, clasping capitulum immediately below. *Inflorescence* broadly cylindric, 60–80 mm long, 60–70 mm wide. *Capitula* 4–7-flowered, subtended by a reddish flushed obpandurate cucullate conduplicate leaf, obtuse and tridentate at apex. *Outer involucral bracts* unequally developed, forming a bilabiate clasping involucre, minutely puberulous but villous proximally; anterior bracts 2 or 3, broadly elliptic, acuminate, 35–40 mm long, 12–16 mm wide; posterior bracts narrowly lanceolate, acuminate, 15–25 mm long, 3–5 mm wide. *Floral bracts* linear-subulate, very densely sericeous, 10 mm long, 1 mm wide. *Perianth* 40–45 mm long; tube inflated, hyaline, glabrous, 3 mm long; claws filiform, minutely puberulous; limbs linear-cymbiform, acute, outer surface villous. *Style* 55–60 mm long. *Pollen presenter* 8–10 mm long, very narrowly ellipsoid-acuminate, slightly constricted proximally and minutely annulate at junction with style; stigmatic groove oblique, on anterior surface of acuminate apex. *Ovary* sericeous, 1–2 mm long, not differentiated from style. *Hypogynous scales* 1,5 mm long, subulate, fleshy. *Fruits* broadly ovoid, 8 mm long 5 mm wide.

Distribution and Habitat

Mimetes fimbriifolius is endemic to the Cape Peninsula, ranging from Table Mountain in the north, where it is becoming increasingly rare, to Cape Point in the south, where the species is still relatively abundant. At the northern end of its range it rarely occurs below 300 metres but at more southerly localities, such as the Cape of Good Hope Nature Reserve, specimens can be found growing almost at sea level. Although this species occurs at lower elevations, it displays a marked preference for rocky montane habitats. The finest specimens will always be found among craggy Table Mountain Sandstone outcrops where they appear to enjoy a measure of protection from fire. In a recent study it was estimated that the total population consists of some 30,000 individuals (Ryan, 1982).

At maturity, *M. fimbriifolius* assumes the form and stature of a small tree. A clearly defined trunk, 250 to 600 mm in diameter, usually branches at about 0,5 m above soil level to form a dense, rounded crown of short, repeatedly dichotomous, interlocking branchlets. Very old specimens in sheltered positions attain up to 5 m in height but on exposed sites the average height is 3 m.

The trunk and upper branches are protected by a thick layer of corky bark, varying from 15 mm thick on the larger upper branches to as much as 25 mm thick on the trunk. Consequently, mature specimens are able to survive veld fires, regenerating from terminal shoots on the upper branches. Trees are rare in open fynbos. Therefore the arborescent life form, so typical of this species, has inevitably made it one of the conspicuous and characteristic elements in the Cape Peninsula's flora.

Mimetes fimbriifolius is the largest, as well as the longest-lived *Mimetes*. Though not always attaining the same height as *M. arboreus*, it has a much greater spread when mature. Growth is very slow; on average twelve to fourteen years elapse between seed germination and first flowering, but some seedlings on favourable sites may flower in their sixth year. There is no precise data available yet on the longevity of this species although circumstantial evidence suggests that ages of one hundred years are frequently attained before certain trees succumb to natural senescence. Nevertheless, most specimens probably seldom exceed sixty years of age.

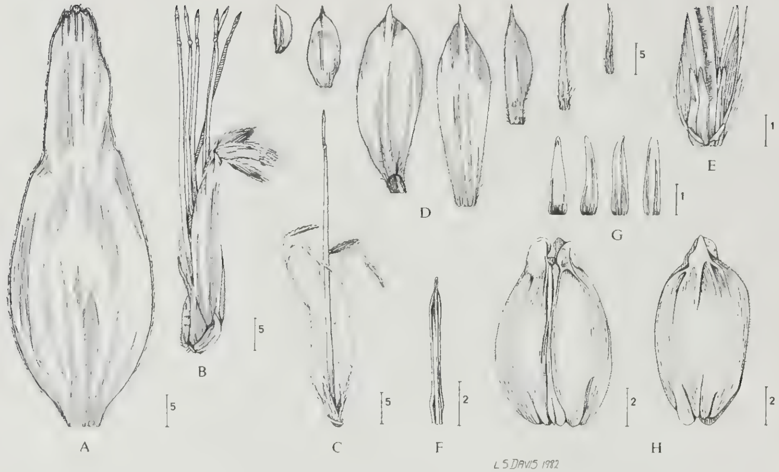

FIG. 8.
Mimetes fimbriifolius (A) leaf; (B) axillary capitulum, lateral view; (C) single flower; (D) involucral bracts; (E) base of perianth; (F) pollen presenter; (G) hypogynous scales; (H) fruits. Scale lines in millimetres.

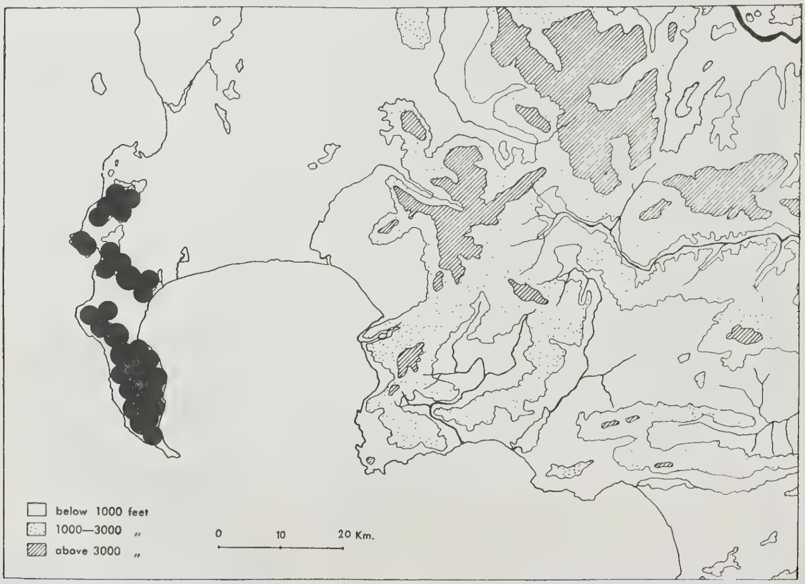

FIG. 9.
Distribution of *Mimetes fimbriifolius*.

Flowering is often rather erratic resulting in odd inflorescences being produced at almost any time of the year. However, the main flowering period commences in about July, reaching a peak in September and continuing until as late as December. Ripe fruits are shed over a period of several months, commencing in January.

DIAGNOSTIC CHARACTERS

Mimetes fimbriifolius is readily distinguished from the related *M. cucullatus* by its arborescent growth habit and the presence of a thick fringe of white pubescence on the leaf margins. Moreover, the leaves are from 22–55 mm long in *M. fimbriifolius*, perceptibly longer than in *M. cucullatus*.

SPECIMENS EXAMINED

CAPE PROVINCE—3318 (Cape Town): Table Mountain, rocky slope at head of Diamond Ravine (-CD), May, *Esterhuysen 18600* (BOL); Table Mountain, Jan. 24th 1811, *Burchell 661* (K); Tafelberg, Kastelberg, Sept., *Zeyher 4681* (NBG, PRE); Table Mountain, near Oudekraal, April, *Zeyher s.n.* (SAM *43690*); Slangkuil near Woodhead Saddle, Nov., *Froembling 318* (NBG); Stinkwater, above Van Kampsbay, Oct. & Nov., *Zeyher 4681* (NBG, SAM); Castle Rock, Kirstenbosch, March, *Compton 15597* (NBG).

—3418 (Simonstown): Simonstown (-AB), Nov., *Meebold 12426* (NY); Garlandskloof, Cape of Good Hope Nature Reserve, Aug., *H. C. Taylor 6884* (STE); Mountains near Witsands, May, *Lotsy & Goddijn 1487* (L); Slangkop, Oct., *Wolley-Dod 1802* (BOL); Mountains between Fish Hoek and Simonstown, Aug., *Hutchinson 151* (BOL, BM,K); Simons Bay hill, July 1847, *Alexander Prior* s.n. (K); In collibus prope Simon's Bay, Oct. 1801, *R. Brown s.n.* (BM); Muizenberg, Sept. 1838, *Krauss s.n.* (NBG); Silvermine valley, behind old silvermine, Aug., *Rourke 1090* (NBG); Karbonkelberg, south east slopes, Oct., *Rourke 928* (NBG); Kommetjie hills, Sept., *Steyn 654* (NBG); Karbonkelberg, *Esterhuysen 26251* (BOL); Kapteins Peak south of Karbonkelberg, above Hout Bay, Dec., *Rourke 1767* (NBG, MO); Smitswinkel (-AD), Nov., *Marloth 340* (PRE); Boy's Kraal River, Jan., *Baker 1179* (BM).

✓ (3) **Mimetes saxatilis** Schlechter ex Phillips in Kew Bull. **1911**: 84 (1911); Phill. & Hutch. in Fl. Cap. **5**: 645 (1912); P. van der Merwe in Landbou Weekblad 15 July 1977: 83 (1977); Rourke in Mimetes: 43–47 (1982); Types: Elim, 24/4/1896, *Schlechter 7716* (K! BM! BOL!); Mierkraal, 25/4/1897, *Schlechter 10521* (K, lecto.!; STE!, PRE!, L!, BM!, PH!, isolectos.).

Mimetes saxatilis Schlechter ined., m.s. annotations on Schlechter's collecting tickets.

Erect shrub 1–2,2 m tall, with a single main trunk branching into several upright, rather sparsely branched stems. *Branches* 5–10 mm in diam., densely velutinous, later becoming glabrous and prominently marked with leaf scars. *Leaves* subpatent to loosely ascending imbricate, elliptic to

broadly oval, 35–50 mm long, 17–30 mm wide; velutinous, later glabrescent, margins fimbriate; apices subacute, entire to tridentate. ***Inflorescence*** **cylindric, 50–100 mm long, 50–60 mm wide, topped by an erect to suberect coma of green elliptic to oval leaves.** *Capitula* **14–22-flowered, subtended by a flat, green undifferentiated foliage leaf.** *Outer involucral bracts* **loosely arranged, broadly lanceolate to ovate, acute, 10–25 mm long, 6–8 mm wide, glabrous but margins fimbriate; inner series narrowly lanceolate, 12–25 mm long, 2–5 mm wide.** ***Floral bracts*** **linear, acuminate, 12–22 mm long, 1–2 mm wide, margins very densely villous.** ***Perianth*** **30–35 mm long, yellow; tube slightly inflated, glabrous, 2 mm long; claws filiform, sparsely villous; limbs linear-cymbiform, 5 mm long, glabrous or nearly glabrous with a few scattered hairs.** ***Anthers*** sessile. ***Style*** slender, pale yellow terminally, 30–50 mm long, glabrous. ***Pollen presenter*** annulate at junction with style, becoming quadrangular-cylindric and then ovoid-acute terminally; stigmatic groove terminal. *Ovary* ovoid, minutely sericeous, 1 mm long. *Hypogynous scales* linear-subulate, 2 mm long. *Fruits* cylindric, 6–8 mm long, 3–4 mm wide.

Distribution and Habitat

Mimetes saxatilis is endemic to the southernmost tip of Africa, occurring in a narrow belt along the coast between Franskraal in the west and Cape Agulhas, whence its range extends a few kilometres eastwards to Struis Bay. The total east-west range is little more than one hundred kilometres, while most populations are found within three kilometres of the coastline at elevations between sea level and one hundred and eighty metres.

Mimetes saxatilis is unusual in that it is an exclusively lowland species favouring an exposed coastal environment. It has very specific edaphic requirements, growing only on limestone deposits or on alkaline, limestone-derived soils. Its natural habitat is wholly restricted to coastal limestone outcrops of the Alexandria Formation, Tertiary to Recent in geological origin.

Scattered stands occur at many places within its range. Sometimes they are locally dominant, occasionally forming small thickets but nowhere is this species really common. It seems to grow best when lodged in potholes or crevices in the soft white limestone, its roots penetrating deeply into the limey bedrock. When fully grown *M. saxatilis* is between one and two metres in height.

Flowering takes place between July and December, but is often very erratic, apparently being significantly influenced by rainfall. A rather low mean annual rainfall of about 400 mm is experienced in most parts of species' range. During very dry seasons when precipitation falls well below this figure, flowering is tardy, while in some instances the flowers may abort before opening. Late August is usually the peak of the flowering season and

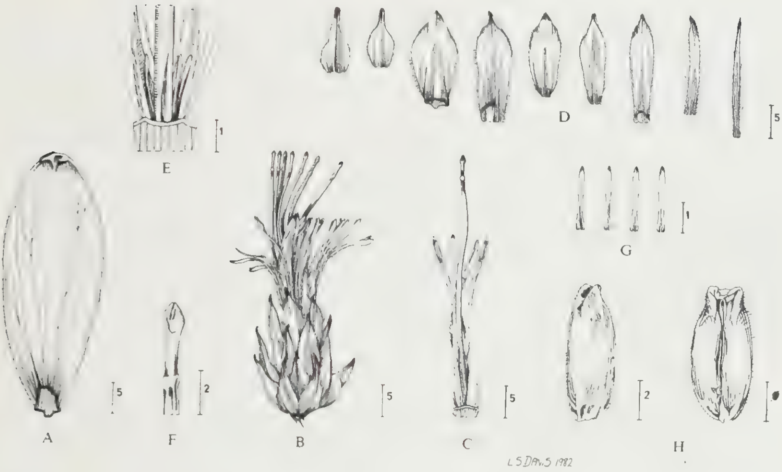

FIG. 10.
Mimetes saxatilis (A) leaf; (B) axillary capitulum; (C) single flower; (D) involucral bracts; (E) base of perianth; (F) pollen presenter; (G) hypogynous scales; (H) fruits. Scale lines in millimetres.

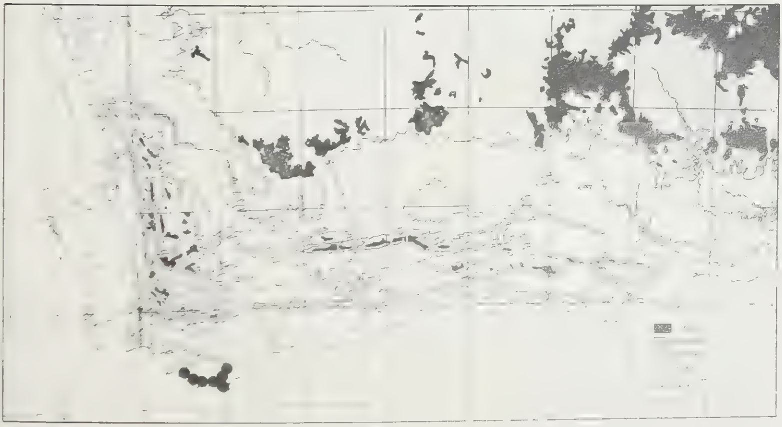

FIG. 11.
Distribution of *Mimetes saxatilis*.

if average or above average winter rains have been experienced, profuse flowering usually follows. Ripe fruits are shed approximately nine months after flowering.

DIAGNOSTIC CHARACTERS

This species is distinguished by its pale yellow involucral bracts, glabrous on the outer surface, though with ciliate margins, by its yellow perianth and style and by its distinctive pollen presenter, cylindric-quadrangular basally and ovoid-acute terminally. The large number of flowers—between twelve and twenty-two—in each axillary capitulum, is also an important characteristic of *M. saxatilis*.

SPECIMENS EXAMINED

CAPE PROVINCE—3419 (Caledon): Limestone hills inland from Pearly Beach (-DA), Oct., *Esterhuysen 32991* (BOL); Klein Hagelkraal, near Pearly Beach, Sept., *Rourke 1661* (NBG, PRE, MO); 1 mile S S W of Waterford near Pearly Beach, Nov., *Boucher 867* (STE); Farm Uintjieskuil, June, *van Breda & Admiraal 1872* (PRE); Kleyn Hagel Kraal, Aug., *Rourke 512* (NBG); Groothagelkraal, limestone hills, May, *Williams 2502* (NBG); Mierkraal (-DB), April, *Schlechter 10521* (K, STE, PRE L, BM PH); Elim, April, *Schlechter 7716* (Bol, K, BM); Rietfontein, foot of hill behind homestead (-DD), Sept., *C.A. Smith 3175* (PRE); Soetanysberg, Oct., *H. C. Taylor 144* (BOL); Soetanysberg, Dec., *Rourke 1020* (NBG); Soetanysberg, between Quoin Pt. and L'Agulhas, June, *Williams 24* (NBG).
—3420 (Bredasdorp): Bredasdorp Poort (-CA), Sept., *Compton 14692* (K, NBG, PRE); Bredasdorp hills, Aug., *Compton 9182* (NBG, STE, BOL); Hill ¼ mile east of Agulhas (-CC), Dec., *Pillans 8148* (BOL); Hills near Struis Bay, *Herre s.n.* (STE *30211*); Northumberland Point, Aug., *Acocks 22637* (PRE); Cape Agulhas on hill behind the lighthouse, Oct., *Rourke 946* (NBG); Hills above St. Mungo Bay, Agulhas, Sept., *Garside 4681* (SAM, K).

(4) **Mimetes splendidus** Salisb. ex Knight in Knight, Cult. Prot.: 66 (1809); Phill. & Hutch. in Fl. Cap. **3**: 646 (1912); J. L. du Plessis and P. van der Merwe in Landbou Weekblad, 14 July 1978: 20–21 (1978); van der Kooy in Veld & Flora **64** (3); 84 (1978); Rourke in Mimetes: 351–57 (1982). Type: Moist alpine places, Barbierskraal, *Niven 75* (K, lecto.!; and in herb. J. E. Smith, LINN, isolecto.!).

Mimetes hibbertii R. Br. in Trans. Linn. Soc. Lond. **10**: 109 (1810); Meisn. in DC., Prodr. **14**: 264 (1856). Type: Moist alpine places, Barbierskraal, *Niven* in herb. Banks, Hibbert & Lambert—not traced but duplicates seen in herb. Salisbury (K!) and J. E. Smith (LINN!).

Protea hibbertii (R. Br.) Poir. Encycl. Meth. Bot. Suppl. **4**: 568 (1816).

Mimetes integrus Hutch. in Fl. Cap. **5**: 647 (June 1912); Hutch. in Kew Bull. **1912**: 282 (Aug. 1912). Type: Banks of the Sonder Einde River near Apples Kraal, *Zeyher 3688* (K, holo.!; SAM, iso.!).

Mimetes mundii Ecklon m.s. on specimen in SAM.

An erect rather sparsely branched shrub to 2,5 m in height with a single main trunk to 60 mm in diam. Bark thin, smooth, grey with horizontal striations. *Branches* stiffly erect when young, usually very sparsely branched, 6–10 mm in diam., sericeous; drooping in old shrubs. *Leaves* sessile, ascending-imbricate, broadly lanceolate to elliptic, 40–55 mm long, 12–25 mm wide, densely silvery-sericeous, apices subacute, usually dentate with 3–4 reddish-amber callus teeth, occasionally entire with a single apical callosity. *Inflorescences* 80–120 mm long, 60–80 mm wide, flattened apically with a coma of small reduced, silvery-pink flushed leaves. *Capitula* 10–14-flowered, subtended by a prominently cucullate, basally auriculate, anteriorly conduplicate leaf, flushed brilliant orange-pink during anthesis. *Involucral bracts* broadly ovate to obovate-oblong, obtuse, glabrous to minutely puberulous, margins ciliate; papyraceous in texture when dry; pale yellowish-amber when fresh, subhyaline incurved and loosely clasping the base of the perianths, 12–18 mm long, 7–10 mm wide. *Floral bracts* linear, 12–16 mm long 2 mm wide, densely sericeous. *Perianth* 30–35 mm long; tube slightly inflated, 3–4 mm long, glabrous; claws filiform, sericeous but crisped proximally; limbs 8–10 mm long, linear-cymbiform, acute, densely sericeous, but crinite apically. *Style* 45–55 mm long, straight, filiform. *Pollen presenter* linear-acute, 5–7 mm long, annulate at junction with style, stigmatic groove obliquely terminal. *Ovary* ovoid, 1 mm long, densely sericeous. *Hypogynous scales* linear-subulate, 2 mm long, bright orange in live state. *Fruits* narrowly ellipsoid, 6–7 mm long, 4–5 mm wide.

There has been considerable confusion regarding the identity of *Mimetes integrus* Hutch., a name which has often been erroneously associated with *M. argenteus* Salisb. ex Knight, as well as having been applied to a species here enumerated as *M. arboreus* Rourke.

Mimetes integrus Hutch., was based on single sheet of a Zeyher collection at Kew, namely, *Zeyher 3688*, from the banks of the Sondereinde River near Apples Kraal. After examining Hutchinson's annotated type at Kew, and also material in other herbaria under the type number, it is now clear that *Zeyher 3688* is a mixed collection made up of both *M. argenteus* and *M. splendidus*. Hutchinson's type—a single flowering branch—is clearly conspecific with *Mimetes splendidus* Salisb. ex Knight, while other specimens distributed under *Zeyher 3688* (e.g. at BOL and NY) are *Mimetes argenteus* Salisb. ex Knight. Duplicates of *Zeyher 3688* cannot therefore automatically be assumed to be isotypes of *M. splendidus*.

DISTRIBUTION AND HABITAT

This is a relatively wide-spread *Mimetes*. Its range extends over a distance of some three hundred kilometres from west to east in a more or less

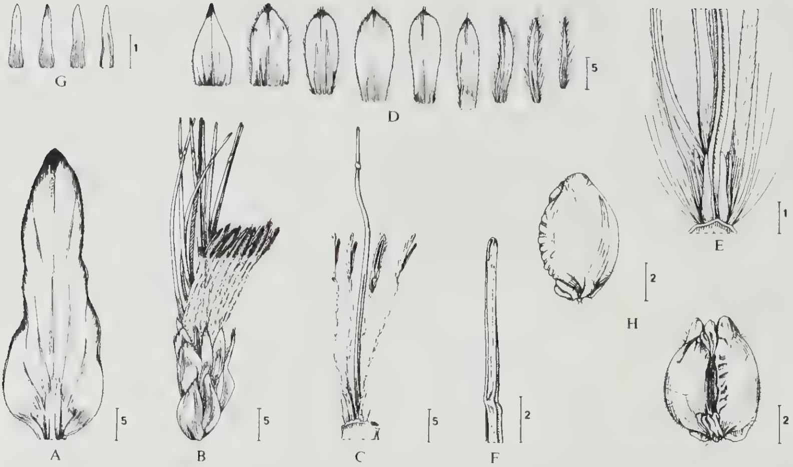

Fig. 12.
Mimetes splendidus (A) leaf; (B) axillary capitulum; (C) single flower; (D) involucral bracts; (E) base of perianth; (F) pollen presenter; (G) hypogynous scales; (H) fruits. Scale lines in millimetres.

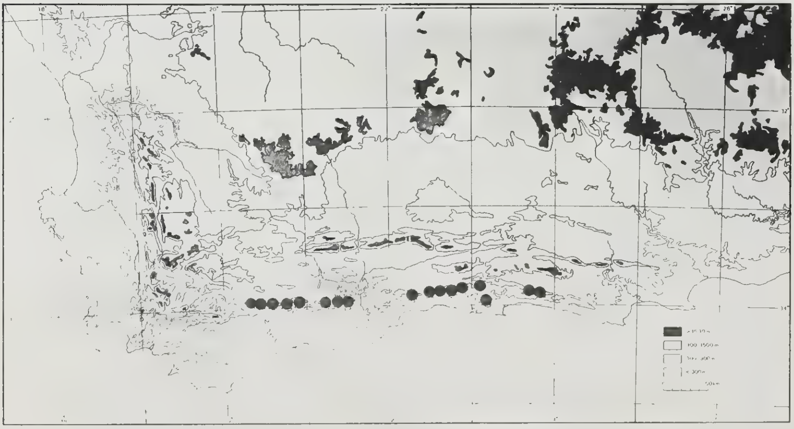

Fig. 13.
Distribution of *Mimetes splendidus*.

straight line along the coastal mountains of the southern Cape, from the Clock Peaks above Swellendam to Rondebos in the Storms River State Forest. Between these points populations occur sporadically in the Langeberg, Outeniqua and Tsitsikamma mountains.

Nowhere is this species common. Sometimes it may be quite solitary or found in small groups of about half a dozen individuals. Only at a few localities are larger stands encountered, consisting of between thirty or forty specimens growing in close proximity to each other.

Mimetes splendidus is a strictly montane species with specialised ecological requirements; in particular, a high yet consistent moisture supply throughout the year. It is confined to the upper south- and south east-facing slopes of the coastal ranges, mentioned previously, always above the 600 m contour, but occurs most frequently at elevations between 1 000 and 1 200 m, on steep slopes of black, peaty, acid soil in dense tall fynbos, often more than two metres in height.

Mimetes splendidus eventually attains a maximum height of about two and a half metres. Characteristically slender and sparse in its growth habit, it has a single main trunk, which only rarely reaches 50 to 60 mm in diameter at the base, even on larger old specimens. Like several other *Mimetes* which regenerate from seed, *M. splendidus* develops rapidly, matures early and senesces by about its twentieth year. By their fifteenth year, most specimens are straggly, their lower branches defoliated. Few survive beyond twenty years, while an occasional individual may persist for as many as twenty-five years, though such longevity is exceptional.

Flowering takes place in mid-winter with the peak of the flowering season being from late May until early July. Ripe fruits are shed approximately eight months after flowering, usually in January or February, depending on the elevation and microclimate of each particular population.

DIAGNOSTIC CHARACTERS

Among silvery-leafed *Mimetes*, this species is easily distinguished by its large, obtuse, broadly ovate to obovate-oblong, involucral bracts which are thin-textured and glabrous or nearly glabrous on the outer surface. In the live state these bracts are yellowish-amber in colour but in dried herbarium specimens they are brown and papery in texture. *Mimetes splendidus* is also unusual among other silver *Mimetes* in that its leaves are almost always tridentate at the apices.

SPECIMENS EXAMINED

CAPE PROVINCE—3320 (Montagu): Swellendam State Forest, south slopes of 12 o'clock Kop (-CD), Aug., *Haynes 656* (STE). Langeberg at Swellendam, south west to western aspect of 12 o'clock peak, May, *[illegible]* (STE): South side of

The Crown, June, *Wurts 182* (NBG); In silva mont. Grootvadersbosch (-DD), Oct., *Zeyher s.n.* (BOL); Grootvadersbosch, Zuurbraak, June, *E. W. Moodie s.n.* (BOL); Lemoenshoek Peak, south slopes, Sept., *Esterhuysen 10504* (BOL, PRE, NBG);✓ Mountains of "Groot Vader Bosch and Traduberg", *Bowie s.n.* (BM); Grootvadersbosch, *Pappe s.n.* (SAM *19852*).
—3321 (Ladismith): South west of Aasvoelkranz above Oudebosch, Garcia Forest Reserve (-CC), June, *Roux 282* (NBG); Upper part of Kampsche Berg, Riversdale (-CD), Sept., *Muir 3342* (BOL, PRE).✓
—3322 (Oudtshoorn): Outeniqua mountains, Wittefontein Forest Station near George (-CD), Aug., *Petzer s.n.* (STE); Lower part of Cradockberg, Sept., *Burchell 6020* (K); Moist alpine places, Barbierskraal (-DC), *Niven 75* (K, LINN); At Knysna (-DD), Nov. (in fruit), *Werdermann & Oberdieck 885* (K); Hoogeberg, south east slopes, Oct., *Keet s.n.* (STE *13113*, PRE).✓
—3323 (Willowmore): Buffelsnek, Knysna (-CC), Oct., *H. C. Taylor 585* (NBG); Stormsvlei State Forest, on a spur east of Rondebos (-DD), Aug., *P. Slingsby s.n.* (NBG *119988*).
—3423 (Knysna): Plettenberg, Knysna (-AB), Aug., *M. M. Mardon s.n.* (NBG *104635*).

✓ (5) **Mimetes argenteus** Salisb. ex Knight in Knight, Cult. Prot.: 67 (1809); Phill. & Hutch. in Fl. Cap. **5**: 647 (1912): Phill. in Flower. Pl. S. Afr. **3**: t. 128 (1924); Bolus, Barclay and Steer, A Second Book of S.A. Flowers: 104–107 (1936); Rourke in Mimetes: 61–67 (1982) Type: "mountain rivulets near the river Zonde Einde", *Niven 74* (K, lecto.; and in herb. J. E. Smith in LINN, isolecto.!)

Mimetes massonii R. Br. in Trans. Linn. Soc. Lond. **10**: 109 (1810); Meisn. in DC., Prodr. **14**: 264 (1856). Type: Montibus prope French Hoek, *Masson s.n.* in herb. Banks. There is no sheet so labelled at BM but another sheet labelled "Mimetes massonii Prom bon spei Mr. Masson" in Brown's hand, taken as lectotype (BM!).

Protea massonii (R. Br.) Poir., Encycl. Meth. Bot. Suppl. **4**: 568 (1816).

Protea nitens Thunb., Fl. Cap. ed.1 (3): 514 (1813). Type: Cape of Good Hope, *Thunberg s.n.* Sheet *2944* in herb. Thunberg (UPS!).

Mimetes ? nitens (Thunb.) Roem. & Schult., Syst. Veg. **3**: 384 (1818): Meisn. in DC., Prodr. **14**: 266 (1856); Phill. & Hutch. in Fl. Cap. **5**: 645 (1912).

An erect shrub of open growth habit, usually to 2 m, occasionally up to 3,5 m, with a single main trunk up to 80 mm in diam.; branched near base; bark thin, smooth, grey. *Branches* erect, rather sparsely branched, 6–10 mm in diam., densely velutinous initially, tending to glabrescent later. *Leaves* elliptic to broadly elliptic, held at right angles to branches, 40–65 mm long, 18–36 mm wide, densely silvery-sericeous, margins sericeously ciliate; entire, apices acute, terminating in a single apical callosity, very rarely tridentate. *Inflorescence* broadly cylindric, 80–150 mm long, 100–120 mm wide, not clearly differentiated from flowering shoot at anthesis, the terminal leaves reduced, oblong, silvery-pink, forming an erect to suberect coma. *Capitula* 6–9-flowered, subtending leaf flat, held at right angles to stem, flushed deep carmine to pale mauve at base but otherwise undifferentiated. *Involucral bracts* ovate-obtuse, 7–15 mm long, 5–8 mm wide, tightly clasping perianths, cartilaginous, becoming woody in fruiting stage, outer surface puberulous but margins minutely ciliate, carmine in live state; inner series narrowly oblong, 10–12 mm long, 2 mm wide, very densely sericeous. *Floral bracts* linear-oblong, acute, 8–10 mm long, 1 mm wide, very densely sericeous. *Perianth* 25–30 mm long; tube glabrous, slightly inflated; claws filiform, densely adpressed sericeous; limbs linear-acute, 10 mm long, sparsely sericeous. *Style* straight, filiform, 40–45 mm long. *Pollen presenter* linear-acute, 7–8 mm long, slightly geniculate at junction with style, stigmatic groove terminal. *Ovary* ovoid-puberulous, 2 mm long. *Hypogynous scales* linear-subulate, 2–3 mm long. *Fruits* ovoid 7–8 mm long, 5 mm wide.

There is a discrepancy between the collector's name given in the original description of *M. argenteus* and the name inscribed on the ticket accompanying the type specimen in Salisbury's herbarium. Salisbury's published account of *M. argenteus* reads: "Mr. F. Masson discovered it by rivulets near the river Zonder End", while a ticket in Salisbury's hand, attached to the type specimen in the latter's herbarium, now at Kew, reads: "by the mountain rivulets near the river Zonde Einde Niven 72". It seems that Masson's name was erroneously substituted for Niven's in the published description.

Distribution and Habitat

The distribution range of *Mimetes argenteus* forms a gentle arc in the south western Cape mountains, from Verkykerskop near Sir Lowry's Pass, along the southern and south eastern slopes of the Hottentots Holland range above Grabouw and Nuweberg to Bushmans Castle at the southern end of the French Hoek Pass; thence to Aasvoelkop and Blokkop above Villiersdorp and along the south slopes of the Riviersonderend mountains from Donkerhoek in the west to Appelskraal beyond Riviersonderend at the most easterly extremity of its range.

Mountain fynbos on steep Table Mountain Sandstone slopes is the usual habitat favoured by *Mimetes argenteus*. It is an exclusively montane species occurring on mesic sites of southerly or south easterly aspect. In such situations shadows are long, precipitation generous (up to as much as 2 500 mm per year at some localities) while atmospheric humidity is relatively high throughout the year. Most populations are found at middle levels; rarely in

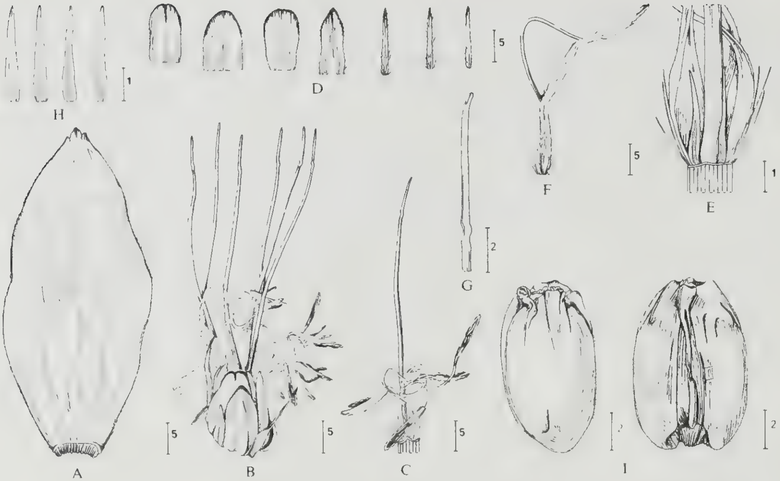

FIG. 14.
Mimetes argenteus (A) leaf; (B) axillary capitulum; (C) single flower; (D) involucral bracts; (E) base of perianth; (F) single flower prior to opening; (G) pollen presenter; (H) hypogynous scales; (I) fruits. Scale lines in millimetres. *Note:* The leaf shown here depicts the uncommon tridentate condition.

the lower foothills or on the uppermost slopes but rather within a zone lying between six hundred and one thousand metres above sea level. Occasionally scattered outliers are found at elevations up to one thousand five hundred metres, but such examples are exceptional.

Although *Mimetes argenteus* obviously favours cooler sites, it is usually found in very well-drained situations on coarse, gravelly, heavily weathered Table Mountain Sandstone in association with ericoid and restioid fynbos. Occasionally, populations occur on deeper soils where black peaty deposits, highly acid in character, have formed in seepage areas. Here again, these sites are well drained.

Mimetes argenteus has a sparse, rather open growth habit. At maturity, it is a shrub between one and a half and two metres in height, though on very moist sites it may occasionally reach three and a half metres, especially if the soil is also deeper than usual. The trunk rarely exceeds 80 mm in diameter and divides very near ground level into several upright main branches. Both trunk and main branches are slender, covered with a thin layer of smooth grey bark, quite unlike the thick juicy bark that covers the relatively massive trunk in *Mimetes arboreus*. A distinctive feature of *Mimetes argenteus* is its

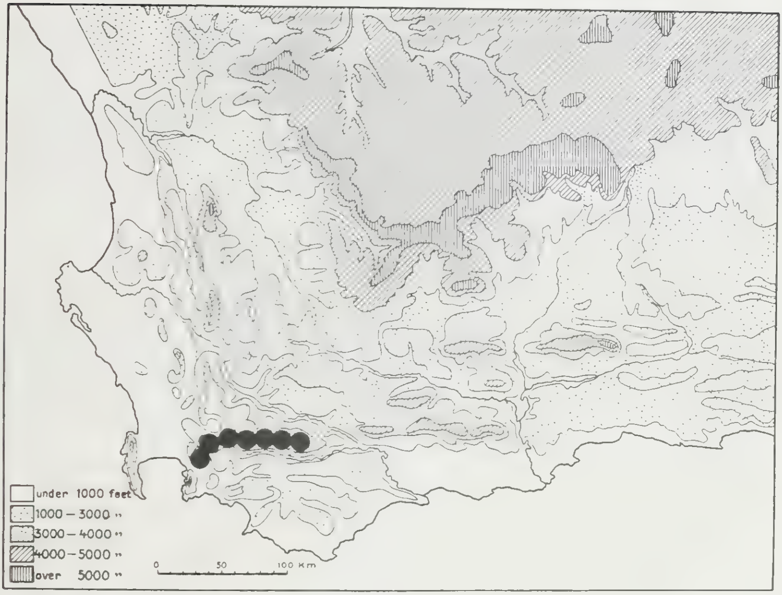

FIG. 15.
Distribution of *Mimetes argenteus*.

tendency to produce long, straight, unbranched growths—sometimes as much as a metre or more in length—without developing any side branches.

At very favourable sites within the species' range, especially certain moist valleys on the south eastern slopes of the Hottentots Holland mountains, quite large stands of *Mimetes argenteus* can be seen, consisting of several hundred individuals. However, this gregarious mode of occurrence is not altogether typical, as this species is usually seen to occur in scattered groups of a dozen or more. In drier situations, especially towards the eastern extremity of its distribution range, it tends to be much rarer and even more widely dispersed.

Mimetes argenteus is a relatively short-lived species depending on cyclical burns to rejuvenate aging populations. Seedlings germinating after a fire make vigorous growth, flowering within five years. Adult plants reach their prime between ten and fifteen years. Thereafter, annual growth increments become shorter as senescence sets in. Most specimens rarely live longer than twenty-five years.

Of all silver-leafed Proteaceae in southern Africa, *Mimetes argenteus* has the most brilliantly reflective, scintillating foliage. The indumentum is particularly dense as well as being smooth and very closely adpressed. Moreover, the whole effect is heightened by the position in which the leaves are held—at right angles to the branches—resulting in maximum light reflection.

Flowering takes place between March and June. During flowering and especially for a few months thereafter, the inflorescence leaves subtending each axillary capitulum, became suffused with pinkish-mauve to carmine pigments, especially in their axils, creating a most arresting effect.

DIAGNOSTIC CHARACTERS

The only other *Mimetes* with which this species could possibly be confused is *M. arboreus*. Marked differences in growth habit easily distinguish them in the field since *M. argenteus* is a one to three and a half metre tall shrub with a loose, open, rather sparsely branched growth habit, quite unlike the dense arborescent form of *M. arboreus*. An unmistakable characteristic of *M. argenteus* is its tendency to produce straight, vigorous, unbranched shoots up to a metre long, terminating in an inflorescence, yet without forming any side branches.

However, the most obvious diagnostic character is the *elliptic to broadly elliptic*, patent leaves, produced at right angles to the branches. The perianth length is also distinctive, being from 25–30 mm in length, somewhat shorter than the 30–40 mm long perianths in *Mimetes arboreus*. It is also worth noting that the inflorescence leaves subtending each axillary capitulum, remain flat and undifferentiated during flowering, apart from becoming brightly suffused with carmine basally.

SPECIMENS EXAMINED

CAPE PROVINCE—3319 (Worcester): French Hoek Peak, south slopes (-CC), June, *Esterhuysen 27795* (BOL); Drakenstein mts., June, *van Breda 1876* (PRE); Franch Hoek mts., towards Villiersdorp, April, *de Villiers s.n.* No. *9851* in herb. Marloth (PRE); Aasvogelkop, eastern slopes, Villiersdorp, April, *Rycroft 2217* (NBG); Blokkop above Villiersdorp, on rocky south slopes south east side of peak (-CD), Nov., *Esterhuysen 35103* (BOL).

—3418 (Simonstown): Moordenaars Kop (-BB), July, *Esterhuysen 2650a* (BOL, PRE); Elgin Forest Reserve, Moordenaars Kop, May, *Stehle 37* (STE); Jonkershoek Forest Reserve, above second waterfall, Nov., *Rycroft 1431* (NBG); Langkloofberg, Hottentots Holland mts., *Stokoe s.n.* (SAM *57378*); Hottentots Holland mts., *Hallack s.n.* (PRE *28985*); Hottentots Holland mts., June 1923 (figured for Flowering Plants of S.A.), *T. P. Stokoe 2728* (PRE, K).

—3419 (Caledon): Dwarsberg, Nuweberg Forest Reserve, May, *Rourke 1535* (NBG, MO); Nuweberg Reserve Elgin (-AA), *Stokoe s.n.* (PRE *28981*); Elgin veld reserve, May, *Stokoe s.n.* (PRE *28984*); Nuweberg, south slopes of Hottentots Holland, May, *Rourke 421* (NBG); Nuweberg Forest Reserve, July, *Williams 470* (NBG); Nuweberg Forest Reserve, source of Palmiet river, May, *Stehle 119* (STE); Elgin Forest

Reserve, Aug., *Hubbard 450* (STE); Donkerhoek mountains at Nooitgedacht farm (-AB), May, *Rourke 1708* (NBG); Mountains above Greyton (-BA), July, *M. Richfield s.n.* (STE); In paludosis ad Appelskraal, Riviersonderend (-BB), *Zeyher 3688* (BOL, in herb. Meisner, NY); Oubos, Zonder end mts., April, *Stokoe 2127* (PRE); Sonderend mts., near Riviersonderend, July, *Marloth 13447* (PRE); Riviersonderend Mountains, Pilaarkop, May, *Kruger 1251* (STE); Riviersonderend, March, *K. Neethling s.n.* (STE *26358*).

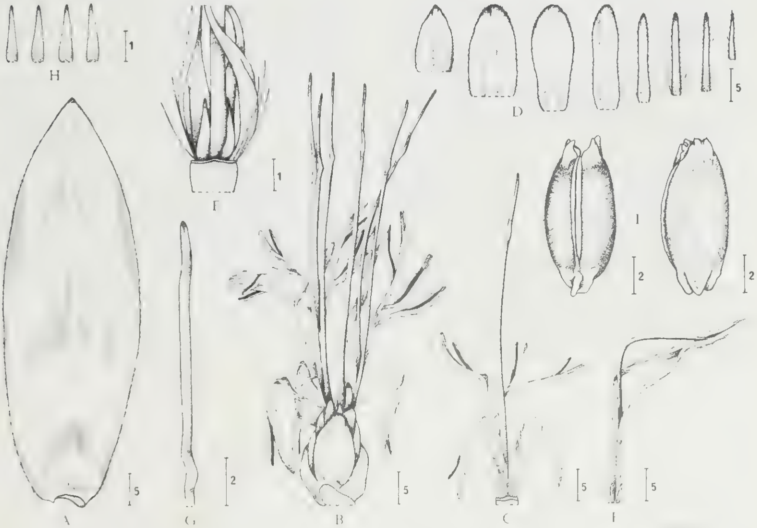

FIG. 16.

Mimetes arboreus (A) leaf; (B) axillary capitulum; (C) single flower; (D) involucral bracts; (E) base of perianth; (F) single flower prior to opening; (G) pollen presenter; (H) hypogynous scales; (I) fruits. Scale line in millimetres.

(6) **Mimetes arboreus** Rourke in Mimetes: 74 (71–77) Oct. 1982. Type: Steenbras Ridge, above Somersfontein, 12.4.1982, *J. P. Rourke 1773* (NBG, holo.!; PRE, K, MO, S, NSW, isos.!).

Icones: Veld & Flora **67** (2) 1981—front cover and title page—habitat.

Large shrub or small tree 2–6 m in height with a clean, stout, clearly differentiated trunk 100–360 mm in diam., usually branching from about 0,5–1 m above ground level; upper branches repeatedly dichotomous, forming dense rounded crown 2–5 m in diam., bark grey with prominent horizontal striations becoming reticulately fissured at base; bark corky up to 10

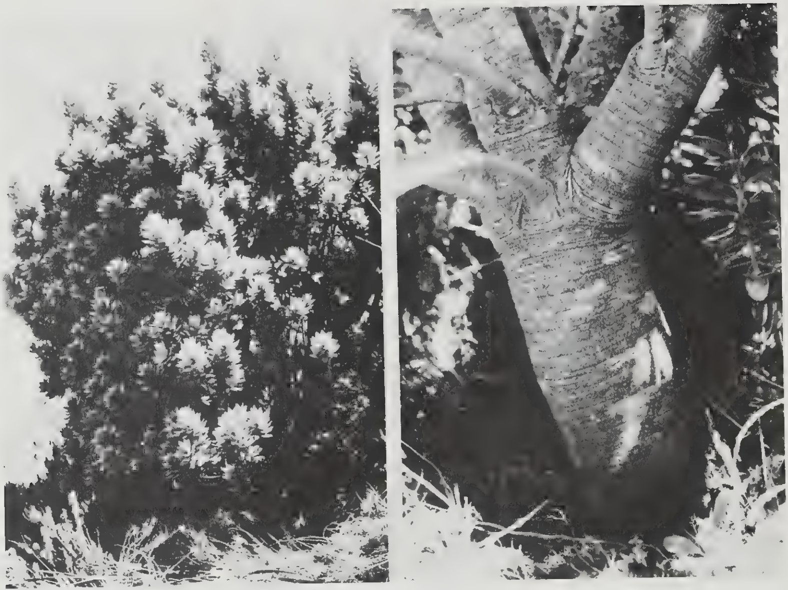

FIG. 17.
Mimetes arboreus: a 20-year old specimen showing its growth habit (left) and stout main trunk (right).

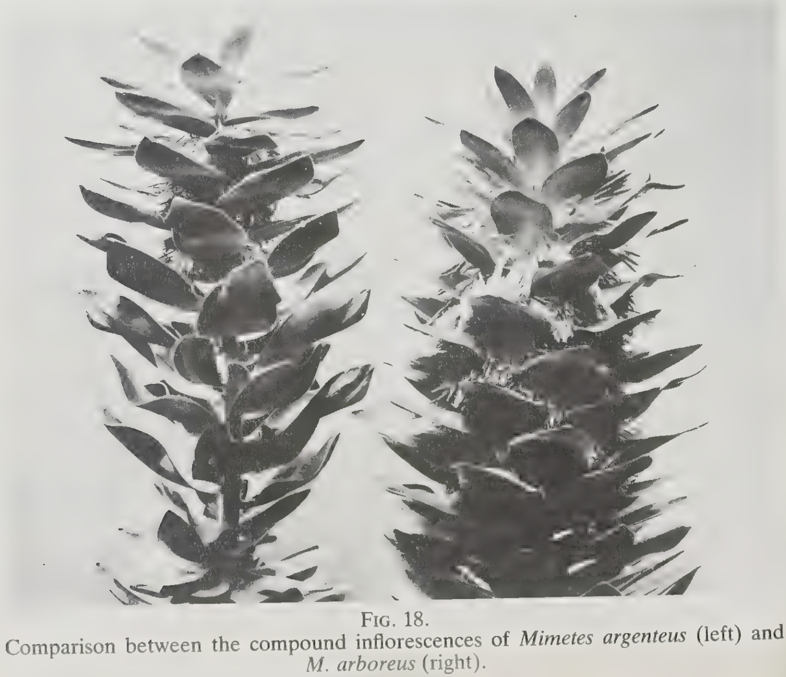

FIG. 18.
Comparison between the compound inflorescences of *Mimetes argenteus* (left) and *M. arboreus* (right).

mm thick on trunk. *Branches* 10–14 mm thick, densely cinereously sericeous to villous, later glabrous; lower branches devoid of foliage, covered with prominent leaf scars. *Leaves* lanceolate-acute, sessile, ascending imbricate, 50–82 mm long, 8–33 mm wide, densely silvery-sericeous, entire with a single dark reddish-amber apical callus (only *very* rarely tridentate). *Inflorescence* broadly cylindric 80–100 mm wide, topped by a flattened coma of reduced, pink-flushed, lanceolate-acute leaves. *Capitula* 8–13-flowered; subtended by a subascending somewhat cucullate leaf, flushed pinkish-orange during anthesis. *Outer involucral bracts* equal, oblong to oval, obtuse to rounded, 10–18 mm long, 5–7 mm wide, cartilaginous, woody when dry, densely sericeous, margins fimbriate; inner series becoming oblong to narrowly oblong, 10–20 mm long, 2–3 mm wide, hirsute. *Floral bracts* linear, 15 mm long, 1–2 mm wide, densely hirsute. *Perianth* 30–40 mm long, straight, usually pink but occasionally pale yellow; tube 3 mm long, quadrangular proximally, inflated distally, glabrous; claws filiform, sericeous to densely sericeous; limbs linear-cymbiform, acute, sericeous, 10 mm long. *Anthers* sessile, linear-filiform, apical boss acute. *Style* straight, filiform, glabrous, 45–55 mm long. *Pollen presenter* linear-filiform, 7–8 mm long, geniculate at junction with style, apex acute, slightly curved, stigmatic groove terminal. *Ovary* ovoid, 2 mm long, densely adpressed sericeous. *Hypogynous scales* linear-subulate, 2 mm long. *Fruits* ovoid, 10 mm long, 5 mm wide.

The earliest herbarium record of *M. arboreus* is a specimen collected by Stokoe labelled "Hangklip mountains 1921". Like most subsequent collections of this arborescent lanceolate-leafed silver *Mimetes* from the Kogelberg State Forest, Stokoe's original material was erroneously identified as *M. integrus* Hutch., a name now reduced to synonymy under *M. splendidus* Salisb. ex Knight. In a few instances other collections were tentatively determined as *M. argenteus* Salisb. ex Knight but in most cases local herbaria persisted in using the name *M. integrus* Hutch. for the Kogelberg taxon. This was perhaps only to be expected as it was clearly not the same as *M. argenteus* Salisb. ex Knight but matched most closely the *Flora Capensis* description of *M. integrus* Hutch. However, *M. integrus* Hutch. is conspecific with *M. splendidus* Salisb. ex Knight and consequently the Kogelberg *Mimetes*, being without a name, has been newly described as *Mimetes arboreus* Rourke. A good colour photograph of *Mimetes arboreus*, in its natural habitat, was featured on the front cover of *Veld & Flora* Vol. 67 (2), June 1981.

DISTRIBUTION AND HABITAT

Mimetes arboreus is endemic to a very restricted area south-east of Cape Town, comprising the Kogelberg State Forest Reserve and immediately adjacent mountains. Occasional populations are dispersed throughout this reserve from Steenbras Ridge and the eastern foothills of Kogelberg Peak above Somersfontein, to the Dwars River mountains and Kuduberg. The most southerly populations are found above Betty's Bay on Pringle Peak, Voorberg and Platberg.

Geographically, *M. arboreus* and *M. argenteus* are mutually exclusive. There is no overlap in their distribution ranges. A low gap in the Hottentots Holland mountains of approximately twenty-two kilometres, centred around Sir Lowry's Pass, separates the most southerly populations of *M. argenteus* on Verkykerskop from the most northerly populations of *M. arboreus* on Steenbras Ridge and the eastern foothills of Kogelberg above Somersfontein.

Mimetes arboreus is an uncommon species; indeed it may be more accurate to describe it as rare, for at any given time there are probably scarcely more than a thousand living individuals within its entire distribution range. Usually tending to be solitary, this species is most frequently observed as a single isolated specimen in mountain fynbos. Small groups of up to a dozen widely scattered individuals are less often encountered, while a large stand, consisting of anything up to a hundred trees, has only been observed at one locality, namely, in the eastern foothills of Kogelberg.

Its habitat is deeply incised mountainous country adjacent to the sea. Steep upper Table Mountain Sandstone slopes at elevations between 450 and 1 200 m, are typical of the terrain. Most populations are found where the aspect is southerly or south easterly, resulting in a cooler microclimate; but despite this obvious preference, *M. arboreus* is occasionally seen on drier and warmer, westerly or northerly slopes. Everywhere within its range the moderating influence of the sea is significant. There are no populations further than twelve kilometres from the coast

Mimetes arboreus is a slow growing relatively long-lived species. A population regenerating after fire has been under intermittent observation by the author since 1963. In 1963 the young seedlings were estimated to be two years old. Their average height was 0,3 m. First flowering in some of these specimens occurred in their fourteenth year, while in others the first flowering was only recorded in their sixteenth year. By their twentieth year they had attained an average height of 2,5 m. Only three or four inflorescences are produced in the first flowering season but on old mature specimens up to 150 inflorescences have been counted.

The largest tree examined by the author, on Voorberg above Betty's Bay, in 1980, measured 6 m in height. This particular tree has a massive trunk 360 mm in diam., branching at 1 m from the ground into four stout arms supporting a broad crown 4 m in diam. Estimating the age of such a tree is difficult but knowing that accurately aged twenty-year old specimens

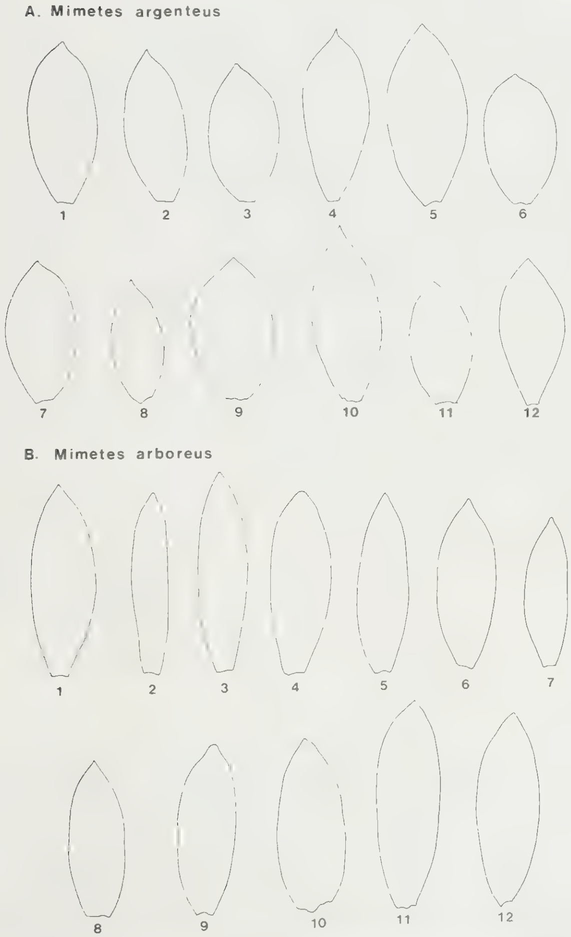

FIG. 19.

Leaf outlines showing differences in form between *Mimetes argenteus* Salisb. ex Knight (A) and *Mimetes arboreus* Rourke (B). The outlines have been traced from collections in STE, NBG and SAM. (A) *M. argenteus*; (1) *Rourke 421*; (2) *Williams 470*; (3) *Rycroft 1431*; (4) *Rycroft 2217*; (5) *Loos* STE *104643*; (6) *Kruger 1251*; (7) *Stokoe* SAM *57378*; (8) *Richfield s.n.* in STE; (9) *Stehle 119*; (10) *Hubbard 450*; (11) *Stehle 37* (12) *Neethling* STE *26358*. (B) *M. arboreus* (1) *Rourke 1478*; (2) *Rourke 1551*; (3) *Rourke 2*; (4) *Esterhuysen 31540*; (5) *Ackerman* SAM *69115*; (6) *Rycroft 1446*; (7) *Ackerman* NBG *104638*; (8) *Kruger 1382*; (9) *Boucher 1324*; (10) *Boucher 1261*; (11) *Boucher 190*; (12) *Powrie 1*.

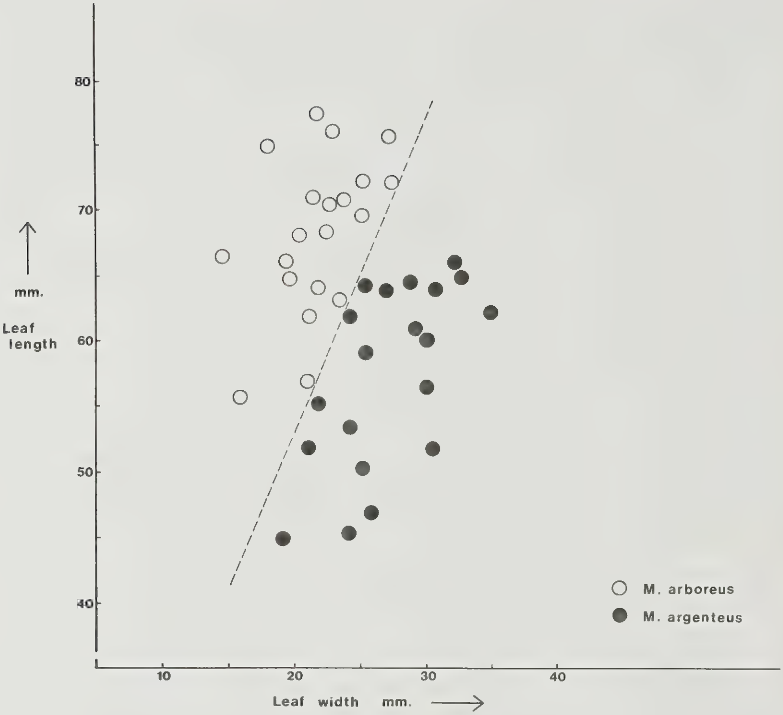

FIG. 20.

Scatter diagram of leaf length plotted against leaf width in *Mimetes argenteus* (black circles) and *Mimetes arboreus* (open circles). Representative leaves from twenty collections of each species in BOL, PRE, NBG, SAM and STE were used to prepare the diagram. No clear-cut separation between the two taxa can be made on the basis of leaf dimensions but it is evident that the leaves of *M. arboreus* are perceptibly longer and narrower than the leaves of *M. argenteus*.

are 2,5 m tall on average, it seems likely that a 6 m tall specimen would be at least fifty years old, if not more. Significantly, large specimens as described above, still appear to be growing vigorously, showing no signs of senescence.

It is evident that *M. arboreus* is slow in reaching sexual maturity as well as being unusually long-lived; factors which must be taken into account in veld management programmes.

Under certain circumstances this species is able to survive burning. Two specimens examined on Kuduberg were found to have survived a light burn. Although most of the lower branches had been destroyed, shoot regeneration from buds, on the uppermost branches, was taking place. However, such instances of survival after a veld fire must be regarded as exceptional despite the relatively thick bark protecting the trunk and branches.

Flowering takes place from April until June. The fruits mature and are released in late December and January.

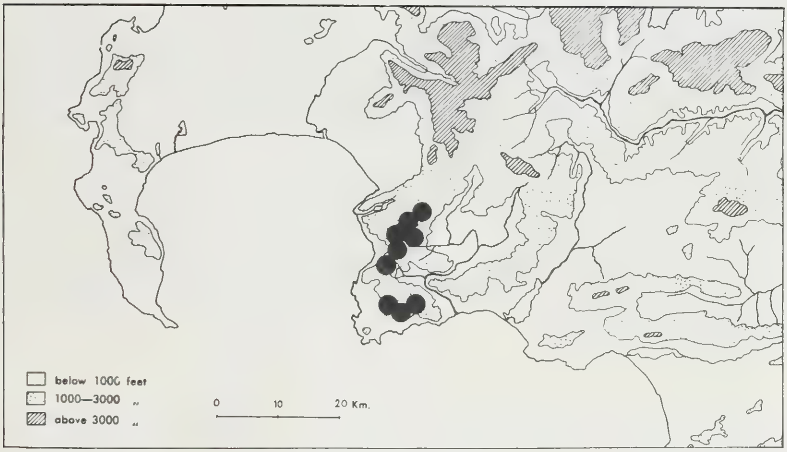

FIG. 21.
Distribution of *Mimetes arboreus*.

DIAGNOSTIC CHARACTERS

Mimetes arboreus is immediately distinguished from *M. argenteus* by its arborescent growth habit. The massive trunk 100–360 mm in diam., covered with 5–10 mm thick bark and the densely rounded crown of short, repeatedly dichotomous branches are particularly characteristic of this species. At anthesis the leaves subtending each axillary capitulum are distinctly cucullate and flushed pinkish-orange ("salmon pink"), unlike the flat, patent, mauvy-carmine subtending leaves in *M. argenteus* (Figs 17 and 18).

It is further distinguished by its ascending-imbricate *lanceolate* leaves. (In *M. argenteus* the leaves are ovate to broadly elliptic). No sharp distinction can be made between *M. arboreus* and *M. argenteus* based on leaf dimensions, but it is clear from the scatter diagram (in Fig. 20) that the leaves of *M. arboreus* are markedly longer and narrower than those of *M. argenteus*. Leaf outlines from collections throughout both species' ranges (Fig. 19) also indicate these differences.

Specimens Examined

CAPE PROVINCE—3418 (Simonstown): Kogelberg State Forest, Spinnekopsnes (-BB), July, *Kruger 1382* (STE); Kogelberg Peak, in a kloof on N E side of summit, April, *Rourke 1481* (NBG, MO); Steenbras Ridge, above Somersfontein, April, *Rourke 1773* (NBG, PRE, K, MO, S, NSW); Ridge east of Spinnekopsnes kloof, May, *Powrie 1* (STE); Ridge east of Spinnekopsnes kloof, May, *Esterhuysen 31535* (BOL); Kogelberg, Spinnekopsnes Range, July, *Boucher 1324* (STE); Northern extremity of Spinnekopsnes Range, south east aspect near Boegoe kloof, May, *Boucher 1261* (STE); Kogelberg Ridge, south side of peak towards Rooiels, May, *Esterhuysen 31540* (NBG); Kogelberg, July, *Ackerman s.n.*(SAM *69115*); Kogelberg Forest Reserve, Nov., *Rycroft 1446* (NBG); Kogelberg, June, *Ackerman s.n.* (NBG *104638*); Hangklip mountains (-BD), *Stokoe s.n.* (SAM *16902*); Pringle Peak, south east slope below summit, July, *Rourke 2* (NBG); Voorberg, Betty's Bay, May, *Rourke 1551* (NBG); Platberg, Kogelberg Forest Reserve, Dec., *Boucher 190* (STE).

✓ (7) **Mimetes hottentoticus** Phill. & Hutch. in Flower Pl. S. Afr. **3**: t. 82 (1923); Everard & Morley, Wild Flowers of the World: 75 (1970); Veld & Flora **61** (1): habitat photo on cover (1975); Rourke in Mimetes: 81–87 (1982). Type: Hottentots Holland mountains south east of Kogelberg, Jan. 1922, *T. P. Stokoe s.n.* PRE *1641* (holotype, PRE!; K!, isotype; BM, isotype!).

An erect shrub of variable growth habit ranging from slender and sparsely branched to rounded and well branched, 1,5–2 m, occasionally 3 m tall, up to 2 m in diam., with upright branches developing from a single stout main trunk up to 100 mm in diam. *Branches* 5–8 mm in diam., cinereously villous, lowermost branches glabrous, devoid of foliage. *Leaves* sessile, ascending to subimbricate, oval to broadly oval 50–75 mm long, 28–40 mm wide, very densely silvery-sericeous, margins villous, apices obtusely tridentate, only very occasionally entire. *Inflorescence* broadly cylindric, 70–140 mm long, 70–120 mm wide, topped by an erect coma of reduced oblong to narrowly oblong leaves, silvery but occasionally pink-flushed. *Capitula* 8–12-flowered, subtended by a flat undifferentiated leaf, remaining silvery during anthesis. *Outer involucral bracts* lanceolate-acuminate 15–22 mm long, 2–5 mm wide, cinereously villous; inner series becoming narrowly lanceolate-acuminate. *Floral bracts* linear-subulate, very densely villous, 12–16 mm long, 1 mm wide. *Perianth* 35–38 mm long; tube quadrangular, 4–5 mm long, glabrous; claws filiform, densely villous; limbs lanceolate-acute, 5–7 mm long, villous. *Anthers* sessile, oblong-obtuse, apical connective usually minutely bilobed. *Style* 65–70 mm long. *Pollen presenter* black, broadly obconic-capitate, with an acute apical papilla containing the stigmatic groove; quadrangularly grooved basally. *Ovary* 3–4 mm long, scarcely differentiated from style; minutely sericeous. *Hypogynous scales* linear-subulate, 2–3 mm long. *Fruits* a broadly ovoid achene 8 mm long.

DISTRIBUTION AND HABITAT

Mimetes hottentoticus is confined to an area of little more than five square kilometres in the Kogelberg Forest Reserve, about seventy-five kilometres south east of Cape Town. The largest population is found on the upper south east slopes of Kogelberg Peak, extending to the head of Spinnekopsneskloof. Smaller, isolated groups occur nearby at the north western end of the Dwars River mountains (also known as Groenlandberg on some maps), as well as on the south east slopes of Kudu Peak, a prominent eminence situated immediately adjacent to Kogelberg. Not only is its spatial distribution very localised, its altitudinal range is equally compressed, being limited to a zone between 1 000 and 1 260 m.

The whole habitat enjoys permanently damp soil. Other moisture lovers like *Chondropetalum mucronatum*, *Brunia alopecuroides* and *Erica desmantha*, are important associated species contributing to the rank surrounding plant cover. Moisture is precipitated throughout the year, mainly from winter north westerlies, but also from cloud banks brought in by the south easterlies of summer.

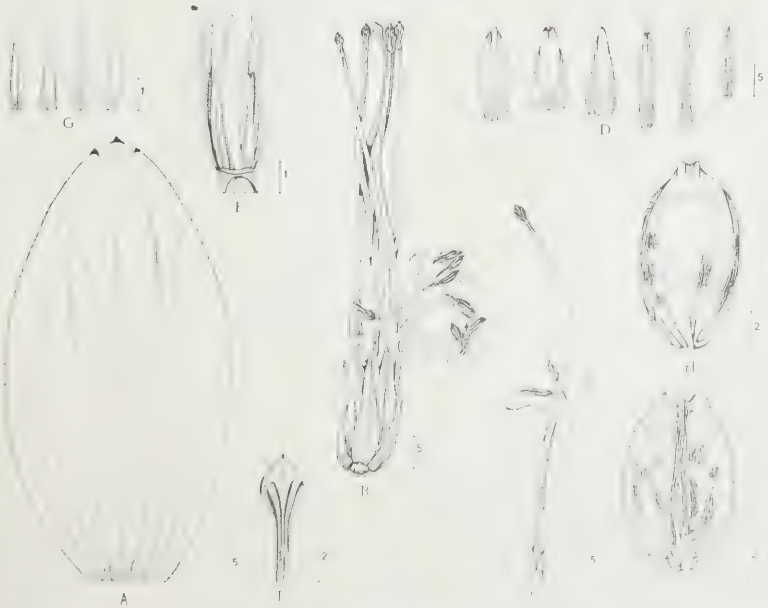

FIG. 22.

Mimetes hottentoticus (A) leaf; (B) axillary capitulum; (C) single flower; (D) involucral bracts; (E) base of perianth; (F) pollen presenter; (G) hypogynous scales; (H) fruits. Scale lines in millimetres.

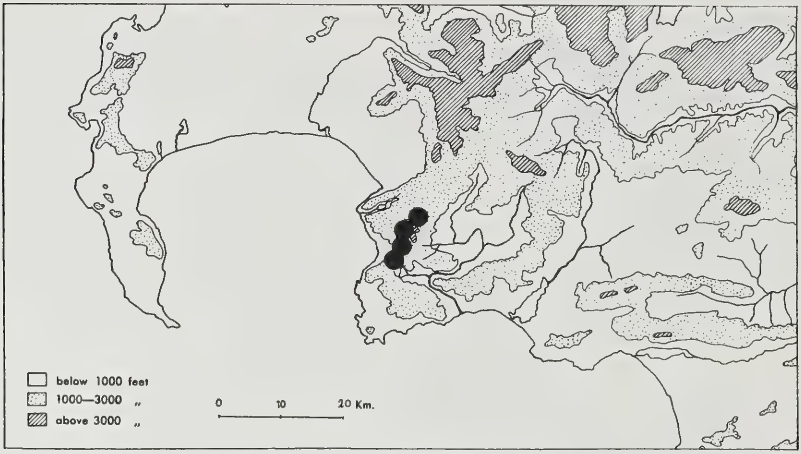

FIG. 23.
Distribution of *Mimetes hottentoticus*.

Like most proteaceous shrubs in fynbos, *M. hottentoticus* is relatively short-lived. Its life span probably rarely exceeds thirty years. At maturity it is a robust shrub two or three metres in height, rounded and moderately well-branched. However, as senescence sets in a less bushy growth habit is developed. Lateral branches are shed, while leaves are also shed from all but the ultimate and penultimate growth flushes. By about twenty years of age most specimens look distinctly moribund with only one or two leader branches, causing elderly specimens to have a sparse leggy appearance. With the advent of a veld fire, practically all adult plants are killed, but in a few rare instances, where the fire is not too severe, an old adult may survive burning, though such cases are seldom encountered. During the first decade, after a fire, great numbers of robust young plants are observed, but as aging takes its natural toll, a steady decline in numbers is apparent. Ultimately, in old veld unburnt for many years, only a few individuals will be found.

Cyclical fluctuations in population size are therefore an important characteristic of this, as well as many other species. These fluctuations can frequently be related to the length of the intervals between fires. At optimum levels of the cycle there may possibly be as many as one thousand five hundred robust specimens of *M. hottentoticus*, while at low points, numbers may drop to one hundred or even fewer moribund individuals. Fire is an essential regenerator in fynbos, yet its periodicity and timing requires critical control to ensure the species' survival.

Flowering commences during the last week of January, reaching a peak in February, continuing into March. Odd specimens may even persist until as late as May, though this is very unusual. The fruits take at least nine months to mature, with the first ripe fruits being shed in late November and early December. They are exceptionally large (on average 8 mm long) and are presently the largest of all *Mimetes* fruits, though it is probable that *M. stokoei* (now extinct) had fruits of comparable dimensions

DIAGNOSTIC CHARACTERS

Mimetes hottentoticus could never be confused with any other species in the genus. It is clearly allied to *Mimetes stokoei* but is easily distinguished from that species by its lanceolate-acuminate involucral bracts and bushy, well-branched growth habit.

SPECIMENS EXAMINED

CAPE PROVINCE—3418 (Simonstown): Steenbras River Valley (-BB), Nov. 1921, *Stokoe s.n.* (BOL); Hottentots Holland mountains, March 1922, *Stokoe s.n.* (BOL *15221*); Hill adjoining and east of Kogelberg, landward side, 1921, *Stokoe s.n.* (BOL); Hottentots Holland mountains, Feb. 1922, *Stokoe s.n.*—with colour sketch (BOL *15221*); Steenbras River Valley, 19 March 1923, *Stokoe s.n.* (BOL *17375*); Kogelberg, May 1939, *Stokoe s.n.* (BOL); Kogelberg State Forest, Spinnekopsnes, Feb., *Kruger 1582* (STE); Kogelberg Forest Reserve, spur at northern extreme of Dwars River mountains overlooking Steenbras dam, Feb., *Boucher 1806* (STE); Kogelberg Peak, April, *Boucher 1250* (STE); Kogelberg, Jan., *Macpherson s.n.* (NBG *104650*); Kogelberg Forest Reserve, Nov. (fruiting), *Rycroft 1442* (NBG); Kogelberg, south east slopes below summit, Feb., *Rourke 257* (NBG); East of Kogelberg at summit of the peak at north end of Five Beacon Ridge, March, *Rourke 1185* (NBG); Kogelberg, June, *Ackermann s.n.* (NBG *104652*); Mountains near Kogelberg, east of Steenbras River, Feb. 1922, *Stokoe s.n. 11059* in herb. Marloth (PRE); Hottentots Holland mountains south east of Kogelberg, Jan. 1922, *Stokoe s.n.* (PRE *1641*), painted by Miss Lansdell for Flowering Plants of S.A. (PRE, K, BM); Kogelberg Peak, east slopes below summit, March, *Rourke 1477* (NBG, MO).

(8) **Mimetes stokoei** Phill. in Kew Bull. **1922**: 198 (1922); Phill. in Flower Pl. S. Afr. **23** t. 916 (1943); Stokoe in Jnl. of Mountain Club of S.A. **54**: 61–63 (1951); Jarvis in Cape Wild Life **13**: 6–7 (March 1958); Rourke in Veld & Flora **62** (4): 12–16 (1976); Rourke in Mimetes: 91–99 (1982). Type: Hottentots Holland mountains south east of Kogelberg, Feb. 1922, *T. P. Stokoe s.n.* (PRE *1642*, holotype!; K, isotype!).

A slender, erect, columnar shrub of monopodial growth habit, 1–2 m in height, usually unbranched but occasionally producing between one and three side branches from upper part of the single main stem at maturity; main stem to 25 mm in diam. at base. *Branches* villous, 5–8 mm in diam. *Leaves* ascending, subimbricate, ovate to broadly ovate-acute, 50–80 mm long, 25–40 mm broad, sessile to subcordate at base, apex acute, tridentate, the central tooth longer and more prominent than the two laterals; densely silvery-sericeous. *Inflorescence* broadly cylindric, 100–150 mm long, topped by a flattened coma of reduced, horizontally patent leaves, having a pinkish-purple hue in live state. *Capitula* 8–12-flowered, subtended by a prominently cucullate leaf; subtending leaves flushed yellowish-gold with a faint pinkish-purple overlay during anthesis. *Outer involucral bracts* oval to rounded, 10–16 mm long, 8–15 mm broad; inner series becoming oblong to linear-obtuse, 15–20 mm long, 3–8 mm broad; sparsely sericeous on outer surface, margins densely sericeously ciliate. *Floral bracts* linear to linear-spathulate, obtuse, 15–18 mm long, 2–3 mm broad, densely tomentose. *Perianth* 35–45 mm long; tube quadrangular, 5 mm long, glabrous but becoming villous distally; claws linear-filiform, densely villous; limbs linear-filiform, acute, scarcely differentiated from claws, 6–8 mm long, villous. *Anthers* sessile, with a broadly saggitate to spade-shaped, black apical connective. *Style* 50–65 mm long. *Pollen presenter* narrowly obconic with an acute apical papilla containing the stigmatic groove, tapering proximally to a distinct annulate junction with style. *Ovary* 1–2 mm long, scarcely differentiated from style. *Hypogynous scales* linear-acute, 3 mm long.

DISTRIBUTION AND HABITAT

Mimetes stokoei was recorded from a single site on Paardeberg in the Highlands Forest Reserve above Kleinmond in the south western Cape. Two small groups consisting of up to a dozen plants, separated by a few hundred metres, occurred between 560 and 600 m above sea level at this site. This species has not been observed or collected at any other locality despite intensive searches in the Kogelberg and Highlands Forest Reserves during the past half century. The type locality is a gently sloping valley with a substratum of light, well-drained Table Mountain Sandstone derived soil, moist in winter but dry in summer. Since 1967 no living plants of *M. stokoei* have been observed and consequently it is now regarded as extinct (Rourke, 1979).

At no time in the recorded history of *M. stokoei*, between 1922 and 1967, did either of these two groups in the field ever exceed much more than about a dozen living plants. The paradox of this species is that although it occupied a near virgin habitat where human influence can be regarded as minimal, it apparently drifted into extinction through natural causes rather than man-induced pressures.

DIAGNOSTIC CHARACTERS

Numerous characters distinguish *Mimetes stokoei* from related taxa; in particular, the largely unbranched monopodial growth habit, the silvery ovate leaves having prominently acute tridentate apices with a central tooth

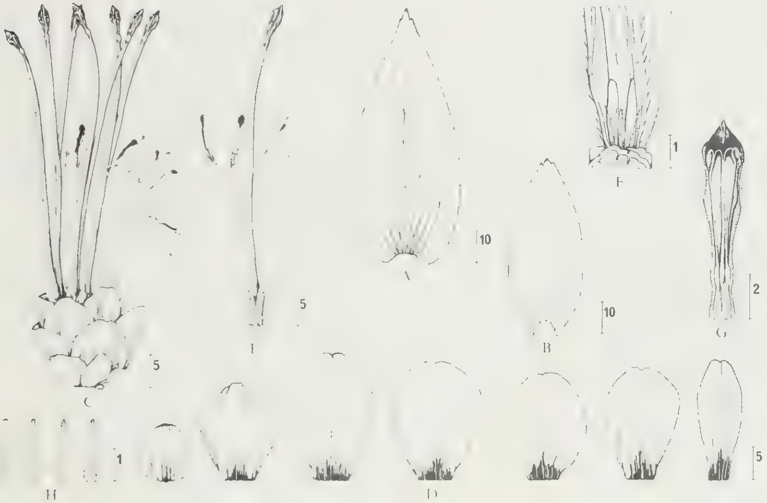

FIG. 24.
Mimetes stokoei (A) mature leaf; (B) immature leaf; (C) axillary capitulum; (D) involucral bracts; (E) single flower; (F) base of perianth; (G) pollen presenter; (H) hypogynous scales. Scale lines in millimetres.

that is longer and more prominent than the two laterals; but most particularly by the rounded to oval involucral bracts.

POSSIBLE REASONS FOR EXTINCTION

1. *Population Size*

The historical evidence points to a critically small population size in *M. stokoei* during this century. Although no accurate figures are available, rough counts of population numbers reported at various times between 1922 and 1967, indicate that no more than about a dozen live plants were counted at any given time (Rourke, 1979). At this stage there is no consensus as to the minimum number of living individuals necessary to maintain an evolutionarily viable population, but Franklin's calculation reported in Frankel and Soulé (1981), that a minimum effective population size of 500 is needed to preserve useful genetic variation, has been given cautious support in some quarters. Even allowing for gross errors in establishing population numbers

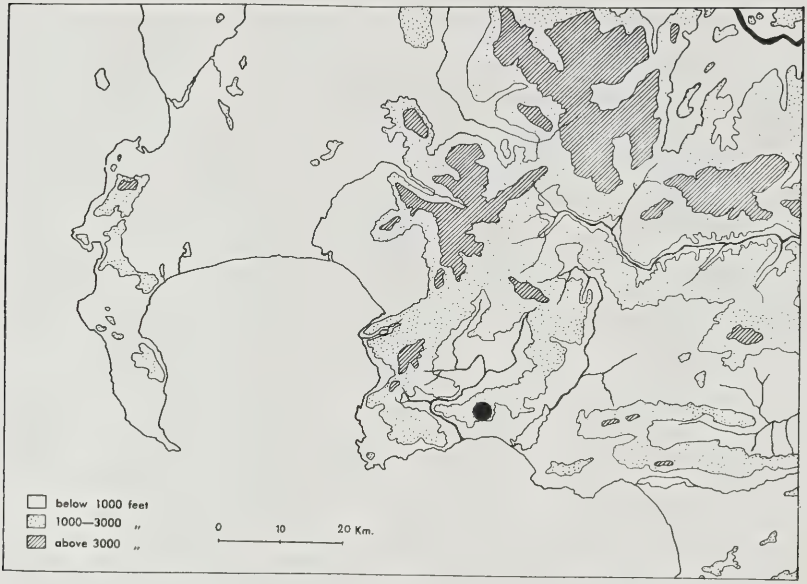

FIG. 25
Distribution of *Mimetes stokoei*.

in *M. stokoei*, the available figures are so far below Franklin's number that it seems clear that population numbers had already dropped to irrecoverably low levels by the time of the species' discovery.

2. *Erratic flowering*

Historical records and also collecting dates on the few extant herbarium specimens, indicate that flowering was recorded in January, February, May, June, July and November. Despite the statistical inadequacy of this record, an erratic flowering pattern is indicated with apparently little synchronisation of flowering.

In very small populations, erratic flowering would have drastically reduced the chances of cross-pollination taking place and consequently annual seed set must be presumed to have been very low.

3. *Growth Pattern and Regeneration Cycle*

An examination of all existing photographs showing *M. stokoei* in its

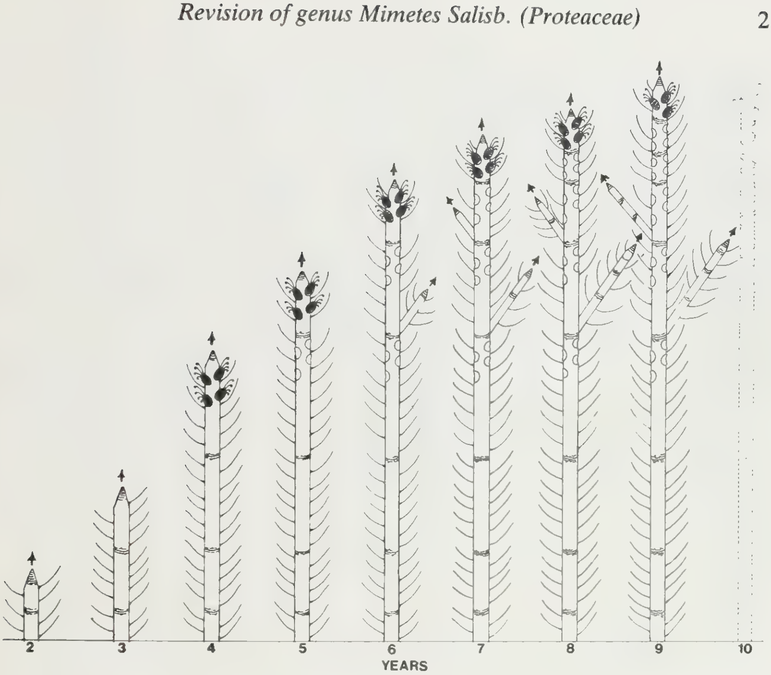

FIG. 26.

Mimetes stokoei. Schematic representation of the life cycle of this species, showing its monopodial mode of growth from seedling through flowering stages, to senescence. Nine years of growth are depicted with death occurring in the tenth year. Note the differences in length of the annual growth increments as the plant develops and ages. Flowering axillary capitula are hatched. The abscission scars of the previous years axillary capitula are also indicated. Apical meristems are indicated with an arrow.

natural habitat indicate that it was characterised by a highly reduced, monopodial growth habit. Coupled with the very early onset of senescence, this mode of growth gave rise to a naturally short, abbreviated life cycle. It appears that the life-span of this species rarely exceeded ten years. *Mimetes stokoei* apparently attained a maximum height of about two metres. Each plant consisted of a single columnar succession of annual growth flushes. Only occasionally was one, two, or at most, three, unbranched side shoots produced. Flowering appears to have commenced from about the third or fourth year from seed. Growth was most vigorous from about three to seven years of age, at which time the growth increments were sometimes as much as 400 mm in a single year. However, from about the sixth year the annual growth increments shortened as senescence set in (Fig. 26).

Seeds falling to the ground during this brief reproductive phase would have been gathered up by ants and buried to form a seed store in the soil (Slingsby & Bond, 1981), only germinating in response to the stimulus of a veld fire. As seed viability diminishes with age, the longer the period of protection from burning after a population senesces the fewer the regenerating seedlings will be. The occurrence of a fire a few years after the majority of plants in a population had died of senescence, would probably have resusIted in a fairly high percentage germination. It is known that a single seedling of *M. stokoei* germinated on Paardeberg fifteen years after the last adults had died, in response to the first fire in the area during that period. (Rourke, 1979). Had a fire occurred earlier, a higher germination rate might have been expected. Prolonged protection of the veld from burning—for periods of twenty years or more—may have been too long a break in the short regeneration cycle of this species to permit adequate seedling regeneration.

The reasons for the decline and extinction of *M. stokoei* will always be speculative but it is possible that the factors described above played significant contributary roles.

Specimens Examined

CAPE PROVINCE—3419 (Caledon): Hottentots Holland mountains, south east of Kogelberg (-AC), Feb. 1922, *T. P. Stokoe s.n.* sub. PRE *1642* (PRE, K); Palmiet River Mountains, Paardeberg, near Kleinmond, June 1943, *T. P. Stokoe s.n.* sub. SAM *54954* (SAM); Top of Paardeberg, Sept. 1950, *T. P. Stokoe s.n.* sub. SAM *60998* (SAM, PRE); Hottentots Holland mountains, July 1925, *T. P. Stokoe s.n.* No. ✓ *6548* in herb. Marloth (PRE); Hottentots Holland mountains (bought in Adderley St., Cape Town, July 4th), comm. *T. P. Stokoe s.n.* (BOL, PRE); Top of Paardeberg, Sept. 1950, *T. P. Stokoe s.n.* (SAM *60998*)—not flowering; Near Hangklip on the Hottentots Holland mountains, figured for Flowering Plants of S.A., June 1943, *T. P. Stokoe s.n.* PRE *27141* (=SAM *54954*); Palmiet Berg, Vogts plot, 12/9/1969, *C. Boucher 630* (STE).

✓ (9) **Mimetes hirtus** (L.) Salisb. ex Knight in Knight, Cult. Prot.: 66 (1809); R. Br. in Trans. Linn. Soc. Lond. **10**: 105 (1810); Reichenb., Ic. Bot. Exot.: 62 t 92 (1827); Meisn. in DC., Prodr. **14**: 262 (1856); Phill. & Stapf in Fl. Cap. **5**: 648 (1912); Bolus, Barclay and Steer, A First Book of S.A. Flowers: 84, 85 (1928); Adamson & Salter, Fl. of Cape Penins.: 327 (1950); Rousseau, Proteaceae of S.A.: 61 (1970); Rourke in Mimetes: 103–109 (1982).

Leucadendron hirtum L., Plant. Rar. Afr.: 8 (Dec. 1760); Sp. pl. ed 2: 136 (1762). Type: C.B.S. without collector or precise locality, sheet *116.36* in herb Linn. (LINN, lecto.!).

Protea hirta (L.) L., Mant. Alt.: 188 (1771); Thunb., Diss Prot.: 43 & 57 (1781).

Pre-Linnaean Citations

Lepidocarpodendron; foliis sericeis brevibus confertissime natis; fructu gracili longo. Boerhaave, *Index Alter Plant.* **2**: 194 t. 194 (1720).

Fruticosa afr. aquat. spina fl. rubro. No date or author. Folio 23, *Index Plant et Animal* in Africana Mus., Jhb.

An erect well-branched shrub 1–2,5 m in height with a single main trunk up to 75 mm in diam.; bark smooth and reddish. *Branches* stiffly upright, very densely villous to lanate initially but soon becoming glabrous, 5–8 mm in diam. *Leaves* ascending imbricate, lanceolate to broadly lanceolate, entire, 25–45 mm long, 5–18 mm wide, apex acute with a single callus point; softly and sparsely villous at first, margins villously ciliate, later becoming glabrous. *Inflorescence* broadly cylindric, 80–140 mm long, 80–90 mm wide, topped by a flattened coma of reduced pink-flushed leaves. *Capitula* 9–14-flowered, subtended by a flat green undifferentiated foliage leaf. *Outer involucral bracts* lanceolate-acuminate, 15–40 mm long, 5–12 mm wide, papyraceous, clasping the perianths, occasionally sparsely sericeous but usually glabrous; apical margins sericeously ciliate; inner involucral bracts narrowly lanceolate-acuminate, subfalcately curved, thinly papyraceous, 20–40 mm long, 4–6 mm wide, margins sparsely sericeous. *Floral bracts* linear-subulate, 5–8 mm long, 1 mm wide, glabrous but margins minutely ciliate. *Perianth* 30–40 mm long, straight; tube quadrangularly inflated, glabrous, 5 mm long; claws filiform, sparsely puberulous proximally becoming sericeous distally; limbs linear-cymbiform, acute, scarcely differentiated from claws, sericeous. *Anthers* sessile. *Style* 50–55 mm long, slightly abaxially curved. *Pollen presenter* 4 mm long, linear-subulate terminally with a terminal stigmatic groove, prominently annulate proximally at junction with style. *Ovary* ovoid, minutely puberulous, 2 mm long. *Hypogynous scales* oblong, obtuse, carnose, 2 mm long. *Fruits* cylindric-oblong, 6–7 mm long, 1,5–2 mm wide.

By the time Linnaeus had published his original description of *Leucadendron hirtum* in 1760, this species would have been known to him not only from Boerhaave's account and illustration which he cited, but also from a specimen labelled "*hirtum*" which must by then have been in his possession and is now in the Linnaean Herbarium (LINN) in London. It is probable that Linnaeus acquired this specimen either in 1758 or 1759 in one or other of two consignments of plants he received from N. L. Burman, who in turn would have obtained the original material from the Cape. This specimen (sheet *116.36* in LINN) is accordingly here designated as the lectotype of *Leucadendron hirtum* L.

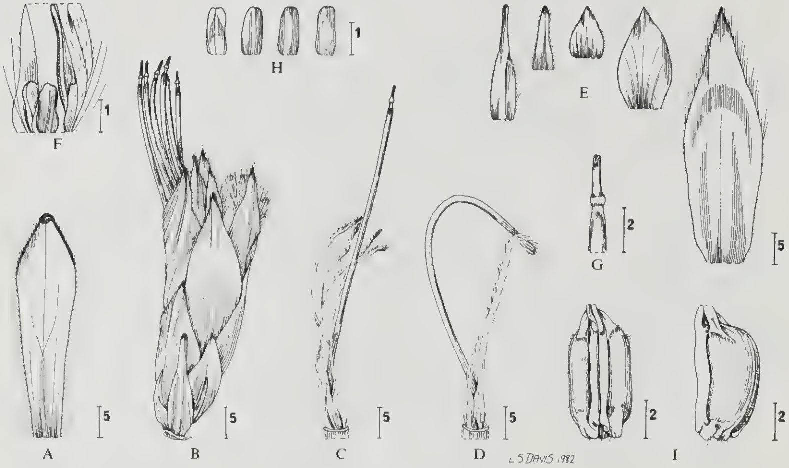

FIG. 27.
Mimetes hirtus (A) leaf; (B) axillary capitulum; (C) single flower; (D) single flower prior to opening; (E) involucral bracts; (F) base of perianth; (G) pollen presenter; (H) hypogynous scales; (I) fruits. Scale lines in millimetres.

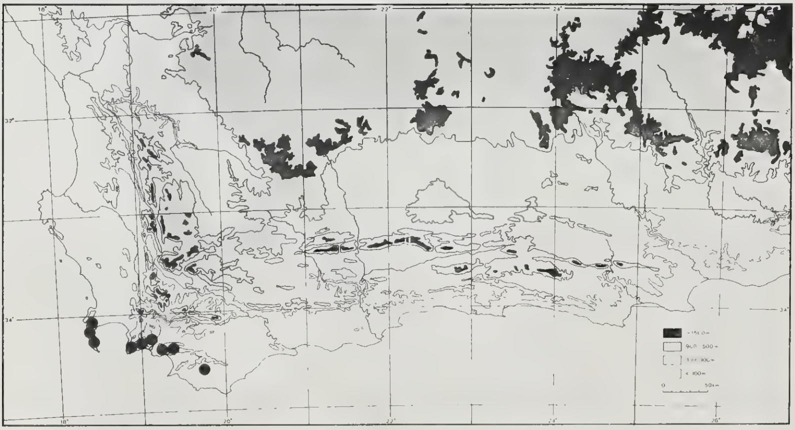

FIG. 28.
Distribution of *Mimetes hirtus*.

DISTRIBUTION AND HABITAT

Mimetes hirtus is endemic to the south western Cape coastal belt from the Cape Peninsula eastwards to Hangklip, Betty's Bay, Kleinmond, Highlands, Bot River and Hermanus, with southerly outliers in the hills around Elim. Its present-day range on the Cape Peninsula extends from Buffel's Bay in the Cape of Good Hope Nature Reserve, northwards to Silvermine reservoir; but in the past, populations were found as far north as Rondebosch.

This is one of the few mainly lowland species in the genus. Practically all known populations are found at elevations between 30 and 50 m above sea level. However, there are a few occurrences at higher levels, such as those at Silvermine and Highlands, where the elevation is some 400 m. These populations are exceptional and represent the uppermost altitudinal outliers.

Mimetes hirtus is essentially a swamp or marsh dweller, usually growing in dense local stands consisting of several hundred individuals. Sometimes populations occur on streambanks but the most typical habitat is in the densely vegetated fynbos communities that occur on rather level, permanently wet, marshy sites, a kilometre or two from the sea. Such plant communities have been termed Erica—Osmitopsis Seepage Fynbos (Boucher, 1978). These specialised associations develop at numerous places along the south western Cape Coast, especially where folded Table Mountain Sandstone peaks rise steeply from the sea but are separated from the shore-line by a narrow coastal shelf or raised beach. Moisture percolating through the high adjacent mountains oozes to the surface in seepage zones along these coastal shelves where deep, black, peaty soils, highly acid in character and sponge-like in texture, have been developed over long periods of time. It is on these seepage zones that *Mimetes hirtus* grows in association with other marsh species like *Erica persicua, Osmitopsis asteriscoides* and *Psoralea aphylla*.

Like most other woody plants in fynbos swamp communities, *M. hirtus* grows rapidly but is short-lived. After germinating, seedlings grow with astonishing vigour, often flowering in their second year. At about five to ten years of age they have usually reached their peak, growing robustly and flowering profusely. But soon the growth rate diminishes as senescence sets in round about the plants' fifteenth year, by which time a maximum height of a little over two metres may have been attained.

Mimetes hirtus is a winter-blooming species which reaches the peak of its flowering period in July and August, although occasionally early flowering specimens can be found in May and June, while late flowering often persists well into November.

Diagnostic Characters

Among those *Mimetes* with enlarged red and yellow involucral bracts, axillary capitula containing more than five flowers, entire leaves and linear-subulate styles, *M. hirtus* is readily distinguished by its long styles which are generally 50 to 55 mm in length.

Specimens Examined

CAPE PROVINCE—3318 (Cape Town): In clivis orientablibus montis Tabularis supra Klaasenbosch (-CD), Aug. 1884, *Bodkin 4929 B* (BOL, K).
—3418 (Simonstown): Wynberg (-AB), Jan., *Roxburgh 36* (K); Rondebosch, Sept., *Mrs. Hugh Jameson s.n.* (K); Garslandskloof, Cape of Good Hope Nature Reserve, Aug., *H. C. Taylor 6885* (STE); Klaasjagers, Sept., *Garabedian s.n.* (PRE);✓ Brightwater, Cape of Good Hope Nature Reserve (-AD), March, *H. C. Taylor 7671* (STE); Smitswinkel, July, *Compton 13316* (NBG, PRE);✓ In ericitis Smitswinkel Bay, May, *Bolus 4928* (BOL); Patrys Vlei, Aug., *Wolley-Dod 1436* (BOL); In arenoso rupestribus pone promontorium Cape Point, Sept. 1888, *MacOwan 911* (BOL, K, SAM); In turfaceis ad rivulus prope Uitershoek, Cap., Sept. 1838, *Krauss s.n.* (NBG); Smitswinkel, Aug., *Barker 736* (NBG); Betty's Bay, flats south of old gaol (-BD), Jan., *Boucher 1097* (STE); Sunny Seas, Betty's Bay, Aug., *Boucher 1866* (STE); Marsh behind Hangklip mountain, April, *Stokoe 406* (STE); Sunny Seas, March, *Vogts 20* (PRE, NBG);✓ Betty's Bay, Sept., *Richmond 36* (NBG); Swamps near Cape Hangklip, March, *Andreae 879* (PRE); Between Pringle Bay and Betty's Bay in a marsh on the SE tributary of the Buffels River, below Voorberg, June, *Rourke 1643* (NBG, MO); Highlands Forest Reserve (-AC), Aug., *Hubbard 469* (STE, BOL); Highlands, Sept., *Hayes s.n.* (NBG *105616*); Paardeberg Mtn., Aug., *Macpherson & Woods s.n.* (NBG *104646*).
—3419 (Caledon): In a swamp above Pools Bay, between Voëlklip & Mossel River, Hermanus (-AD), Oct., *Rourke 1146* (NBG, STE); Hermanus, March, *van Niekerk s.n.* (STE *30215*); Klein River Mtns., Oct., *Stokoe s.n.* (BOL *16756*); Three miles south west of Elim (-DA), Oct., *Willaims 1449* (NBG); Elim, Dec., *Schlechter 9647* ✓ (BM, K, PRE); In convalle humide prope Elim, Dec., *Bolus 8591* (K, BOL).

Doubtful locality records: —3319 (Worcester): Franshoek mts. (-CC), June 1931, *J. Brink s.n.* (STE *11476*).
—3421 (Riversdale): Hills at Plattekloof (Heidelberg–Swellendam) (-AA), Sept. 1911, *Muir 663* (PRE).✓

✓ (10) **Mimetes pauciflorus** R. Br. in Trans. Linn. Soc. Lond. **10**: 106 (1810); Meisn. in DC., Prodr. **14**: 263 (1856); Phill. & Hutch. in Fl. Cap. **5**: 648 (1912); Rousseau, Proteaceae of S.A.: 61 (1970); P. van der Merwe in Landbou Weekblad 24 Feb. 1978: 37 (1978); Rourke in Mimetes: 113–119 (1982). Type: Africa australis, *W. Roxburgh s.n.* (BM, lecto.!).

Protea pauciflora (R. Br.) Poir., Encycl. Meth. Bot. Suppl. **4**: 568 (1816).

Mimetes rehmanni Gandoger & Schinz in Bull. Soc. Bot. Fr. **60**: 51 (1913). Type: Outeniqua Mts., Montagu Pass, *A. Rehmann 136* (Z, holo.!).

An erect sparsely branched rather straggly shrub 2–4 m tall with a single main trunk to 50 mm in diam.; bark smooth, reddish. *Branches* erect, 6–

8 mm in diam., densely villous. *Leaves* ascending, imbricate, narrowly to broadly oval, obtuse, 25–40 mm long, 8–20 mm wide; entire with a single amber callus point at apex; surface rather sparsely adpressed villous, margins villously fimbriate. *Inflorescence* 100–400 mm long, 50–55 mm wide, cylindric, composed of approximately 40 to 120 densely arranged, upwardly pointing axillary capitula overtopping a small, terminal coma of reduced erect foliage leaves. *Capitula* 3-flowered (rarely 4-flowered), subtended by a flat, undifferentiated green foliage leaf. *Involucral bracts* lanceolate-acute, 10–25 mm long, 5–8 mm wide, fleshy, 4 to 5 in number, outermost bracts glabrous, innermost bracts pubescent at apex. *Floral bracts* 3 in number, greatly enlarged, yellow with the appearance of involucral bracts, lanceolate-acute, tightly clasping perianths to below perianth limbs, 40–55 mm long, 12–15 mm wide, glabrous proximally but becoming villous distally. *Perianth* 45–50 mm long, straight; tube 2–3 mm long, bulbous, formed by the hyaline, fleshy, outwardly bowed perianth bases, glabrous; claws filiform, covered with long, straight, spreading trichomes; limbs very narrowly lanceolate, linear, acute, 5–6 mm long, glabrous, bright red in live state. *Anthers* sessile. *Style* 45–50 mm long, tapering terminally. *Pollen presenter* 3–4 mm long, linear-filiform-acute, with a slightly annulate thickening at junction with style; stigmatic groove terminal. *Ovary* ovoid, densely puberulus, 2 mm long. *Hypogynous scales* 1 mm long, oblong-obtuse, fleshy. *Fruits* cylindric, 7 mm long, 3 mm wide.

DISTRIBUTION AND HABITAT

Mimetes pauciflorus is native to the southern Cape coastal mountains where its total east-west distribution range covers some two hundred kilometres. This species is thus rather more widespread than many of its congeners. The most westerly records are from Ruitersberg, due east of the Robinson Pass, between Mossel Bay and Oudtshoorn. From there populations are fairly evenly dispersed (though in a narrow belt, scarcely five kilometres wide), along the southern slopes of the Outeniqua and Tsitsikamma mountains to an area beyond Formosa Peak, almost reaching the Karreedouw Pass at the species' most easterly limits.

Except where there is forest in kloofs or sheltered valleys, the well-watered seaward slopes of these southern Cape coastal mountains support tall, exceptionally dense fynbos communities termed "hygrophilous macchia" (Phillips, 1931). *Erica hispidula, Leucadendron conicum, Leucadendron eucalyptifolium, Berzelia lanuginosa* and *Widdringtonia cupressoides*, are among the more prominent component species on the permanently moist southern slopes. It is in this dense vegetation, in montane, often steeply sloping situations, at elevations between 450 and 1 400 m, that

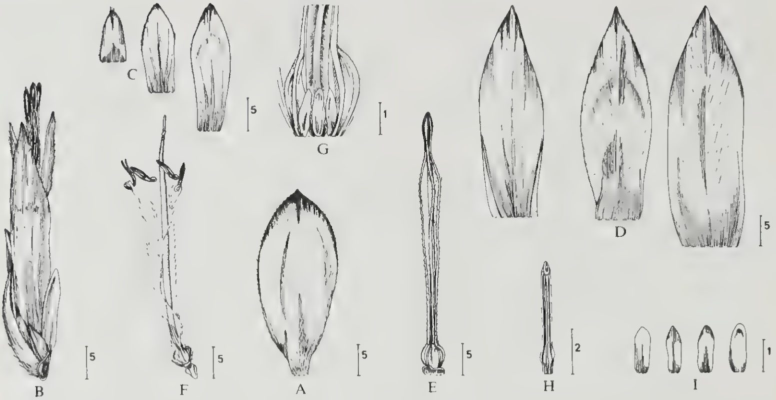

FIG. 29.
Mimetes pauciflorus (A) leaf; (B) axillary capitulum; (C) involucral bracts; (D) three floral bracts; (E) single flower prior to opening; (F) single flower on opening; (G) base of perianth; (H) pollen presenter; (I) hypogynous scales. Scale lines in millimetres.

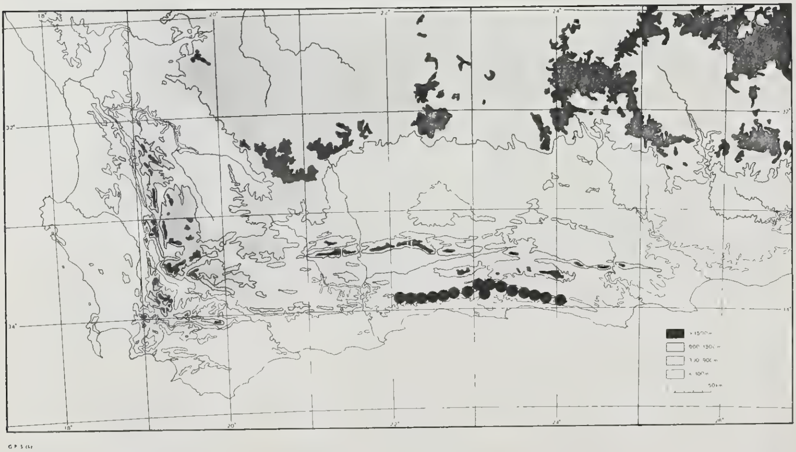

FIG. 30.
Distribution of *Mimetes pauciflorus*.

scattered populations of *M. pauciflorus* are found. Few other *Mimetes* are so dependent on a high, though even, water supply. Indeed, the species' entire distribution range falls within a region receiving a mean annual precipitation of at least 1 000 mm or more. The important requirement however, is not so much a high mean annual rainfall but the regularity and evenness of its distribution throughout the year.

Mimetes pauciflorus may ultimately attain a height of four metres when mature but most species seldom exceed three metres. Young plants grow rapidly and with great vigour, producing stiffly upright vegetative shoots up to half a metre long each year. As they age however, a rather sparse, open, straggly growth habit develops. Annual growth increments become shorter and leaves are shed from all but the ultimate and penultimate annual growth flushes, leaving the reddish-brown stems quite bare. Most specimens become senescent at between ten and fifteen years of age, while few survive much beyond their twentieth year.

Flowering takes place from August until November. The peak of the flowering season is in September. Robust young specimens may occasionally produce enormous inflorescences up to 400 mm long. Such outsize inflorescences are by far the most massive in the whole genus and may be composed of as many as one hundred and twenty individual axillary capitula.

An unusual feature of this species is the upward-facing position of the axillary capitula. Moreover, their involucral and floral bracts are tightly rolled around the three flowers which make up each capitulum, resulting in a tube-like structure. Each capitulum is functionally equivalent to a single tubular flower and is treated as such by pollinating sugarbirds and sunbirds, which often puncture the basal bracts with their bills to gain access to the nectar. Another characteristic is that those capitula on the northern (or warmer) side of an inflorescence develop faster and open sooner than those on the southern (or cooler) side. This differential rate of development causes partially open inflorescences to have a distinctly asymmetrical appearance; a situation not obvious in other *Mimetes*. Initially, the bracts are a rich yellow but deepen with age, eventually becoming quite orange in colour.

Diagnostic Characters

This species is distinguished by its entire oval leaves and by having only three (very rarely four) flowers in each axillary capitulum.

Specimens Examined

CAPE PROVINCE—3322 (Oudtshoorn): Ruitersberg, south slopes (-CC), Nov., *Oliver 4114* (STE); Ruiterskop, Nov., *Compton 21834* (NBG); lower slopes of Postberg (now Cradockberg) (-CD), 20/9/1814, *Burchell 6014* ([illegible], BM, STE, [illegible]).

PRE, L); Geelhoutboomsberg, July, *Taylor 3524* (STE, PRE); Georgetown, Aug. 1847, *Alexander Prior s.n.* (K, PRE); Lower slopes of Cradockberg, George, on a spur between Tierkloof and Power Stream, Sept., *Rourke 1489* (NBG, MO, K, PRE, S); South slopes of Wildevarkberg, Geelhoutboomsberg Forest Reserve, Nov., *Rourke 1272* (NBG); Mountains at George, Jan. 1859, *Pappe s.n.* (SAM *19854*); Tierkop, George (-DC), Nov., *W. Bond 685* (NBG); Klein Langkloof on Karatara boundary (-DD), *Vogts 80* (PRE, STE); Spitskop, Knysna, June, *Keet 536* (STE, PRE); Millwood, slopes south of Streepbosch creek, Sept., *Fourcade 5295* (BOL); In Montibus pone Millwood, Aug., *Tyson 1523* (K, STE, SAM); Windmeulnek, Karatara, Aug., *Vogts 704* (NBG); Upper Molen River, on ridge between Stormberg and Hoëberg, Sept., *Rourke 904* (NBG, STE); South east slopes of Hoogeberg, Outeniqua Range, Oct., *Keet 1010* (PRE, STE, PH, BM).
—3323 (Willowmore): Ridge above van Huysteen's Bosch, Deepwalls (-CC), July, *Keet 536* (BOL); Slightly south of summit of Jonkersberg, Gouna Forest Reserve, Aug., *E. A. Goodwin s.n.* (BOL); Buffelsnek, Knysna, Oct., *H. C. Taylor 584* (NBG); Helpmekaar (-DC), Jan., *Compton 10453* (NBG); Peak Formosa, Tsitsikamma mts., Dec., *Esterhuysen 27362* (BOL); Helpmekaar Peak, Jan., *Esterhuysen 4571* (BOL); Between Storms River and Lottering River, Oct., *Fourcade s.n.* (BOL); Half a kilometre south of Peak Formosa, Aug., *Olivier 1407* (NBG); Grenadiers Cap, Tsitsikamma mts., Oct., *Olivier 1412* (NBG); Bloukrans State Forest, path to Kleinheuningbos, July, *H. C. Taylor 9842* (STE).

(11.) **Mimetes palustris** Salisb. ex Knight in Knight, Cult. Prot.: 66 (1809); Phill. and Hutch. in Fl. Cap.: 649 (1912); Phill. in Flower Pl. S. Afr. **1** t. 36 (1921); P. van der Merwe in Landbou Weekblad 15 July 1977: 83 (1977); Rourke in Mimetes: 123–129 (1982). Type: without precise locality, growing in wet marshes "in dark uninhabited fruitful mountains", *Niven s.n.* in herb. R. A. Salisbury (K, lecto.!).

Mimetes decapitata Meisn. in DC., Prodr. **14**: 262 (1856). Type: In paludosis montium circa Hottentotsholland prope ostium fl. Klynrivier, *Zeyher 3690* ex parte, in herb. Meisner (NY, lecto.!).

Low suberect shrub to 0,5 m (very rarely to 1 m) in height, up to 0,7 m in diam., with a single main stem to 5 mm in diam.; bark brown. *Main stem* branching at 50–100 mm, giving rise to a few erect, vigorous, unbranched shoots and numerous lax, laterally sprawling occasionally dichotomous branches; stems 1,5–3 mm in diam., villous, becoming glabrous. Erect shoots producing vigorous inflorescences with 5–12 capitula, laterally sprawling branches bearing 2 or 3 capitula or occasionally a single terminal capitulum. *Leaves* lanceolate-elliptic, 15–20 mm long, 5–10 mm wide, markedly patent on lower branches becoming very broadly ovate, 20 mm long by 15 mm wide and imbricate to clasping on vigorous upright shoots; acute, entire with a small apical callus; densely villous, margins villous-ciliate, later glabrescent. *Inflorescence* narrowly cylindric, 10–45 mm long, consisting of 5–12 axillary capitula. *Capitula* 35 mm long, 3–6-flowered, subtended by a green undifferentiated foliage leaf. *Involucral bracts* imbricate, clasping

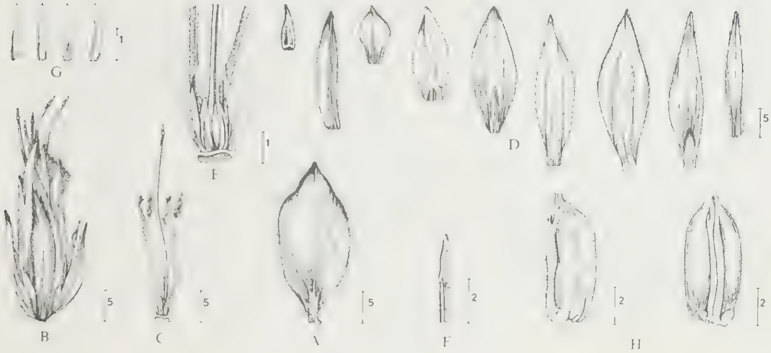

FIG. 31
Mimetes palustris (A) leaf; (B) axillary capitulum; (C) single flower; (D) involucral bracts; (E) base of perianth; (F) pollen presenter; (G) hypogynous scales; (H) fruit. Scale lines in millimetres.

perianths at anthesis; outer bracts linear-lanceolate, 15–20 mm long, 2–4 mm wide, green and foliaceous; inner bracts narrowly lanceolate to lanceolate-elliptic, 20–30 mm long, 4–10 mm wide, sharply acute, papyraceous, outer surface sparsely sericeous. *Floral bracts* linear, narrowly lanceolate, 10 mm long, outer surface very densely sericeous. *Perianth* 20–25 mm long; tube quadrangular, 2–3 mm long, glabrous; claws filiform, sericeous, limbs linear-filiform, acute, not differentiated from claws, sericeous to glabrescent. *Anthers* sessile, 2 mm long. *Style* 35 mm long, straight to slightly abaxially arcuate. *Pollen presenter* linear, acute, 2 mm long, with a geniculate annular thickening at junction with style. *Ovary* ovoid, 1–2 mm long, densely puberulous except on adaxial quarter. *Hypogynous scales* linear-subulate,1 mm long. *Fruits* cylindric, grey-brown, beaked apically, ventral suture prominent, minutely puberulous.

DISTRIBUTION AND HABITAT

Mimetes palustris is endemic to the Klein River mountains, a range which rises steeply from the sea along the southern Cape coast between Hermanus and Stanford. This species is one of the most narrowly endemic of all *Mimetes*. Its total area of distribution scarcely exceeds a few square kilometres. The most westerly populations occur on Platberg in the Fernkloof Nature Reserve, while the most easterly occur some ten kilometres further along the range in an area just beyond Rocklands Peak. Between

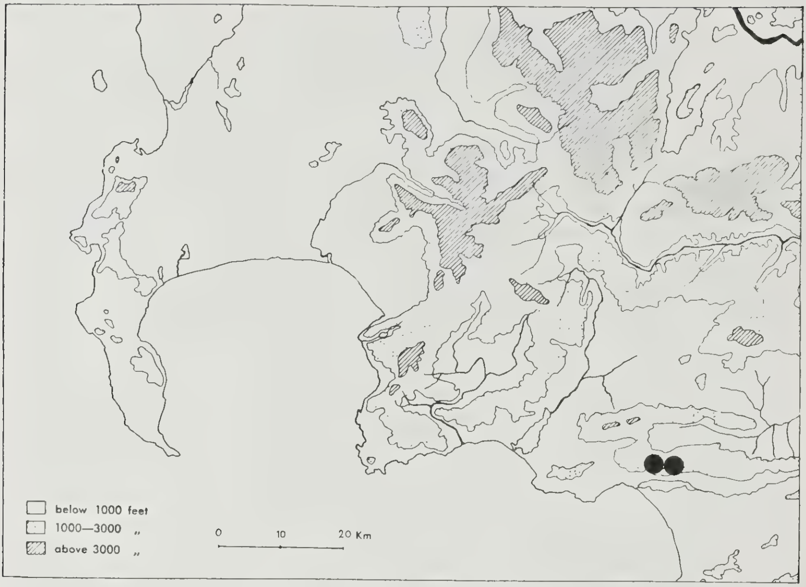

Fig. 32.
Distribution of *Mimetes palustris*.

these two points, in a narrow belt about one kilometre wide, occasional scattered populations can be found.

If the spatial distribution of *Mimetes palustris* is limited, its altitudinal zonation is even more restricted as all known populations occur within a zone between the 600 and 900 metre contours.

Though not a true swamp dweller, *Mimetes palustris* requires permanently moist habitats. It occurs in a variety of niches; on fairly level, open, turfy sites; on the edges of seepage shelves associated with *Roridula gorgonias, Erica hispidula, Brunia alopecuroides* and *Villarsia ovata*, and even on the steep mossy banks such as are found on shaded south slopes below summit ridges. Always the aspect is south-facing, partly shaded in summer, while often in deep shadow for long periods during winter. Invariably it will be where cool updraughts from moist south easterlies condense to humidify both soil and atmosphere during the dry summer months. In all these situations the soil is exceptionally acid with a high humic content.

An unusual feature of this species is its dimorphic mode of growth, which is only obvious in fully mature shrubs. At approximately 50 to 100 mm above soil level the single main stem divides into two fairly distinct branch systems; firstly, a series of lax, weakly developed, laterally sprawling, occasionally divided branches; and secondly, several stiffly erect vigorous upright shoots, usually unbranched. Tightly clasping ascending imbricate leaves cover the strong upright branches, while the diffuse lateral branches are covered with loosely arranged patent leaves. As the lateral branches are often concealed amongst the associated vegetation, *M. palustris* tends to be very cryptic and easily overlooked. Only the erect shoots are usually tall enough to attract attention. Occasionally these shoots have been known to reach a metre in height but this is clearly exceptional. Most mature shrubs rarely produce upright growths more than half a metre in height.

Populations of *Mimetes palustris* may vary from less than a dozen plants to almost three hundred individuals, yet even large groups are easily overlooked as they are so cryptically concealed in the surrounding vegetation. The characteristically low stature of this species, coupled with an essentially winter-flowering habit, results in an uneven development of axillary capitula, due to the low winter sun. What invariably happens is that the axillary capitula develop on one side of the inflorescence—the side on which most sunlight falls. This is usually the north side of a flowering shoot but in some situations, depending on the light-blocking effect of adjacent mountain peaks, the axillary capitula develop on the south east-facing side of the erect flowering shoots.

Another singular feature, peculiar to this species, is the development of terminal, as well as axillary capitula. The typical axillary capitula are produced on the upright branch system, while single terminal capitula are occasionally borne at the apices of the lax, rather diffuse, lateral branches.

Mimetes palustris has a rather ill-defined flowering period though it is best described as winter-flowering. The capitula in each inflorescence open sporadically over a period of time, from early July until late November. Furthermore, they do not open in strict acropetal succession and so both fruiting and unopened capitula can usually be found in each inflorescence. Fruits mature approximately four months after pollination has taken place. In the post-pollination phase the developing fruits are clasped within a fleshy envelope formed by the involucral bracts. When mature, an abscission layer develops at the axillary capitulum's point of attachment to the main stem, thereby interrupting the vascular supply, which soon results in the bracts losing their turgidity. As the involucral bracts dry out still further, they become completely everted, expelling the now mature fruit in the process

DIAGNOSTIC CHARACTERS

Among those *Mimetes* having linear-subulate styles and entire leaves, *M. palustris* is readily distinguished by its short styles, 30 to 35 mm in length.

SPECIMENS EXAMINED

CAPE PROVINCE—3419 (Caledon): Stanford mtns. (-AD), July, *Stokoe 9499* ✓ (PRE); Klein River mtns., Aug., *Stokoe 16613* (BOL); Klein River mtns., Sept., *Esterhuysen 4373* (BOL); Klein River mtns., between waterfalls and Rocklands Peak, *Stokoe s.n.* (BOL); In very wet soil near stream on top of Klein River mtns., *Stokoe* NBG *1868/28* (BOL); Aasvoelkop above Hermanus, Sept., *Rourke 1246* (NBG); East of summit of Aasvoelkop above Mossel River, July, *Williams 1436* (NBG); Between waterfall and Rocklands Peak, Klein River mtns., *Stokoe s.n.* (SAM *541760*); Rocklands Peak, Aug/Sept., *Stokoe s.n.* (SAM *19856*); East of Rocklands Peak, Sept., *Stokoe s.n.* (SAM *56245*); Klein River mtns., Aug., *Stokoe s.n.* (SAM *28393*); Between Hermanus and Stanford, Aug., *Stokoe 1418* (K); Fern Kloof Nature Reserve, June, *Orchard 407* (STE); Platberg, western end of Klein River Mountains, Hermanus, Oct., *Rourke 1493* (NBG, PRE, MO, K, S). ✓

✓ (12.) **Mimetes capitulatus** R. Br. in Trans. Linn. Soc. Lond. **10**: 106 (1810); Meisn in DC., Prodr. **14**: 262 (1856); Phill. & Hutch. in Fl. Cap. **5**: 644 (1912); Phill. in Flower. Pl. S. Afr. **2**: t 58 (1922); Rousseau, Proteaceae of S. Afr.: 62 (1970); P. van der Merwe in Landbou Weekblad 15 July 1977: 82 (1977); Rourke in Mimetes: 133–139 (1982). Type: "2 Mimetes capitulata Africa australis", so labelled in R. Brown's hand taken as lectotype (BM, lecto.!). W. Roxburgh is given as collector in type description but no collector's name is inscribed on the above sheet.

Protea capitulata (R. Br.) Poir., Encycl. meth. Bot. Suppl. **4**: 568 (1816).

An erect rounded shrub to 2 m, with a single main stem; crown compact, densely branched; with age developing several erect, usually unbranched straggling shoots. *Branches* 5–8 mm in diam., villous initially, later glabrous. *Leaves* ascending imbricate, lanceolate to broadly lanceolate to ovate, 20–35 mm long, 8–20 mm wide, sharply acute, entire, with a single thickened apical callus; hispidly villous initially, later glabrescent. *Inflorescence* cylindric, 60–100 mm long, 60–80 mm wide, terminated by an erect shoot of foliage leaves, not differentiated into a distinct coma. *Capitula* 10 to 13, usually 11-flowered; subtended by a broadly ovate foliage leaf occasionally tinged carmine during anthesis, 25–40 mm long, 15–20 mm wide, very densely hispid, margins hispidly ciliate. *Outer involucral bracts* very narrowly lanceolate to linear, 15–25 mm long, 3–6 mm wide, erect and ascending, greenish-white, carmine-flushed, tomentose; inner bracts lanceolate to broadly lanceolate, sharply acute, 15–40 mm long, 8–14 mm wide, orange-red, hyaline and glabrous proximally, softly puberulous distally. *Floral bracts* narrowly

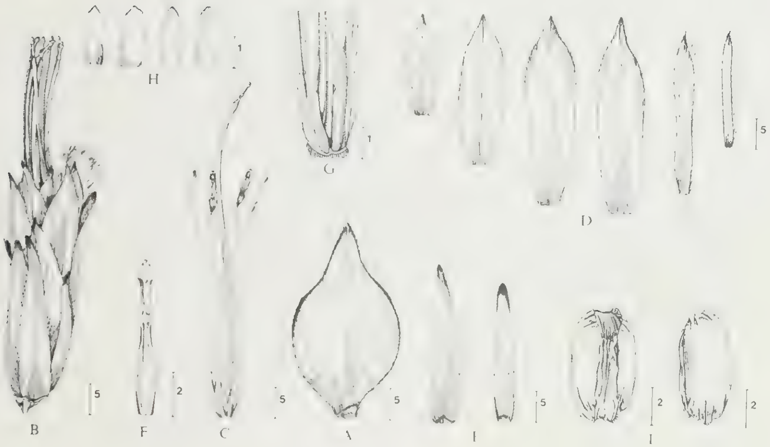

FIG. 33.
Mimetes capitulatus (A) leaf; (B) axillary capitulatum; (C) single flower; (D) involucral bracts; (E) floral bracts; (F) pollen presenter; (G) base of perianth; (H) hypogynous scales; (I) fruits. Scale in millimetres.

lanceolate-acute, 30–35 mm long, 5–10 mm wide, orange-red, glabrous proximally, puberulous and ciliate distally. *Perianth* 30–40 mm long, tube glabrous proximally, slightly inflated, 5–7 mm long; claws filiform, sericeous, limbs linear-acute, densely sericeous. *Anthers* 4 mm long, sessile. *Style* 45–55 mm long elongating at anthesis and becoming strongly arcuate, straightening later. *Pollen presenter* 5–7 mm long, annulately swollen at junction with style, narrowing and becoming capitate to conic-acute at apex; stigmatic groove terminal. *Ovary* ovoid, 2 mm long, sericeous. *Hypogynous scales* linear-obtuse, fleshy, 2 mm long. *Fruits* cylindric, 5–6 mm long, 2–3 mm wide, minutely puberulous.

DISTRIBUTION AND HABITAT

This rare species has a rather fragmented distribution range in the coastal mountains of the south western Cape. Most populations are scattered on the higher mountains surrounding the drainage basin of the Palmiet River; notably on Kogelberg and adjacent peaks, on Paardeberg near Kleinmond, and along Groenlandberg above Grabouw. Outlying populations

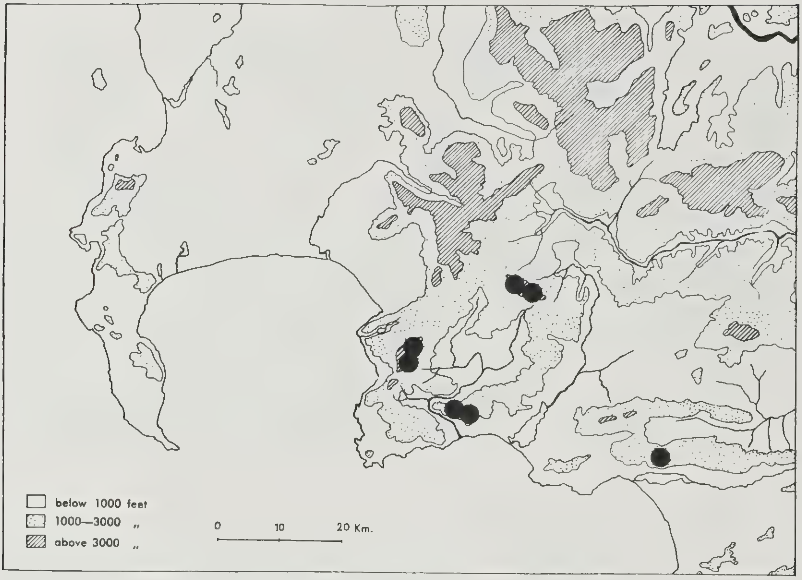

FIG. 34.
Distribution of *Mimetes capitulatus*.

have also been recorded from the Klein River Mountains at Hermanus but there have been no confirmed sightings there in recent years.

With the exception of the various populations on Groenlandberg, which may on occasions consist of as many as a thousand individuals in total, practically all other known stands of *Mimetes capitulatus* contain no more than about a hundred plants and may often be composed of as few as a dozen. The reasons for this natural rarity are not clear but it is likely that very specific habitat requirements could be a limiting factor.

Mimetes capitulatus, like its near relatives *M. hirtus* and *M. palustris*, requires permanently moist, even swampy growing conditions. It is moreover, a montane species confined to Table Mountain Sandstone peaks that are either immediately or nearly adjacent to the sea, at elevations varying from 600 to 1 200 m. Whether situated at the uppermost or lowermost levels of this altitudinal range, most populations are found immediately below a summit or summit ridge on cool, south east-facing slopes. It is at these particular sites that clouds, driven in by summer south easters, condense to precipitate their moisture loads during otherwise rainless periods. Deep, peaty sponges develop here with water slowly percolating through the intensely acid humus-rich substratum. These distinctive seeps are marked by a prominent swamp flora with other moisture-loving species like *Berzelia ecklonii, Brunia alopecuroides, Chondropetalum mucronatum* and *Klattia partita*, often occurring in dense association.

Robust young plants at between five and ten years of age form rounded shrubs to about a metre in height. At this stage they flower profusely. However, as they age, the rounded bushy form remains but in addition, several erect, largely undivided and rather lanky branches develop, sometimes attaining two metres. These shoots eventually become quite devoid of leaves except on the ultimate and penultimate growth flushes which continue to bear inflorescences, while the lower bushy growths produce very few flowerheads. The development of this mode of growth marks the onset of senescence. Flowering diminishes, growth increments shorten and leaves are shed. After about their twentieth year most plants in a population have become depauperate or moribund. Few survive for more than thirty years. Like so many other montane proteaceous shrubs from moist habitats, *Mimetes capitulatus* is essentially short-lived and depends on periodic cyclical burns to rejuvenate senescent populations. Indeed, it is probable that a burn once every twenty years is essential to the maintenance of viable populations of this species.

Mimetes capitulatus flowers from late winter until early summer, opening towards the middle of June and continuing until December. August, however, is the peak of the flowering season. The fruits mature during summer and can be gathered from November until February, depending on local conditions.

DIAGNOSTIC CHARACTERS

Among *Mimetes* having prominent yellow to red involucral bracts and entire leaves, *Mimetes capitulatus* is distinguished by its unique pollen presenter which is capitate to conic-acute at the apex, then cylindric and becoming annulately swollen at its junction with the style.

SPECIMENS EXAMINED

CAPE PROVINCE—3418 (Simonstown): Kogelberg (-BB), Nov., *Stokoe s.n.* (SAM *56266*); Landward side of Kogelberg, Aug., *Stokoe 871* (PRE); Kogelberg Forest Reserve, slopes of Spinnekopsnes, Nov., *Rycroft 1450* (BOL, NBG); Kogelberg summit, Nov., *Jackson s.n.* (NBG *56375*); Near Hangklip (-BD), Aug., *Stokoe s.n.* (PRE *1457*)—painted by Miss Lansdell for Flowering Plants of S.A.; Paardeberg, Kogelberg, March, *Vogts 73* (PRE, STE); Palmiet River, *Stokoe 6559* (BOL); Palmiet River, Paardeberg mountains, Oct., *Stokoe s.n.* (SAM *25264*); Paardeberg, above mouth of Palmiet River, Dec., *Rourke 20* (NBG); Summit of Paardeberg overlooking Fairy Glen, Feb., *Boucher 1156* (STE).

—3419 (Caledon): Lebanon Forest Reserve (-AA), June, *Kruger 84* (STE); Mt. Lebanon, Groenlandberg Range, Aug., *Rourke 1485* (NBG, MO, K, PRE); Mt. Lebanon, Elgin, Oct., *Oliver 3008* (STE); Grietjies gat, Aug., *Zeyher 3690* (SAM); Bankrot Kloof, Elgin district, *J. S. Linley s.n.* (SAM *60919*); Lebanon Forest Reserve, Sept., *Martin 1037* (NBG); South east slopes of Groenlandberg, in kloof below Mt. Lebanon, Sept., *Rourke 1103* (NBG); Kleinmond (-AC), Sept., *Le Roux s.n.* (STE *11467*); Klein River mts. (-AD), *Stokoe s.n.* (SAM *44592*); Mountains above Klein River Mouth, May, *Stokoe 8375* (BOL).

Species Non Satis Cognitae

Mimetes floccosa Salisb. ex Knight in Knight, Cult. Prot.: (1809); Phill. & Hutch. in Fl. Cap **5**: 649 (1912). Type: "A species discovered in Hottentots Holland by Mr. F. Masson", according to original description but no type specimen has been traced.

Phillips and Hutchinson (1912) regarded this as an imperfectly known species, noting that "Masson's type appears to be lost." I have also failed to trace Masson's type despite several careful searches at BM, K, and other European herbaria where Masson's specimens are thought to be preserved. The original description is so brief and so vague as to be equally applicable to several species of *Mimetes*. Consequently, until the type specimen comes to light, *Mimetes floccosa* Salisb. ex Knight, must be regarded as insufficiently known.

Hybrids

Natural interspecific hybrids in *Mimetes* are rare. The only recorded instances of natural hybridisation are those detailed below:

(1) *M. cucullatus* x *M. fimbriifolius*

Several collections of natural hybrids between the two above-mentioned species have been made at various places on the Cape Peninsula, where the parent species occur sympatrically. Though morphologically intermediate between the parent species, the hybrids tend to resemble *M. cucullatus* in growth habit. Their basal stems are usually very stout, covered with thick cartilaginous bark.

The following collections have been examined:

CAPE PROVINCE—3418 (Simonstown): Rocklands neck at head of Klaver Valley, on south west slopes of Swartkop (-AB), April, *Rourke 1713* (NBG, PRE); South slopes of Rooihoogte near Smithswinkel (-AD), Nov., *L. Guthrie* in herb T. M. Salter *8551* (NBG, K); East side of Rooihoogte, Cape Peninsula, *Garside 5045* (BOL); presumed parents from same locality are *M. fimbriifolius* (*Garside 5044* in BOL) and *M. cucullatus* (*Garside 5046* in BOL).

(2) *M. hirtus* x *M. capitulatus*

Material of this hybrid has been in cultivation at Kirstenbosch since

1978, after having been collected from a natural hybrid growing in a population of *M. capitulatus*.

The following collection has been examined:

CAPE PROVINCE—3418 (Simonstown): Perdepeak (-BD), 2100 ft, 2/8/1978, *B. B. Tarr s.n.* (NBG).

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The drawings of floral dissections are the work of Mrs. L. S. Davis, while the diagrams in Figs 3 and 26 were prepared by Mrs. J. Loedolff.

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